Old sciences in India – An introduction

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Knowledge before printing and after

Science and tradition

What is meant by the English word 'science' and its Sanskrit equivalent 'vijnyāna'?

In either case, the root meaning is 'knowledge'. The English 'science' comes from the Latin 'scientia', which means 'knowing' or 'knowledge'. The Sanskrit 'vijnyāna' comes from 'jnyāna' or 'knowledge', to which is added the prefix 'vi-'. This prefix implies a sense of distinction; and it thus describes a knowing that clears away confusions, by discerning different things.

A similar sense of discernment is implied in the English word 'science'[1]. It refers to a special kind of knowledge, which is clarified through reason and analysis. Such a clarification is needed whenever something is found wrong in what we take for knowledge. In particular, we find that our perceptions of the world are often too narrow. And, along with this narrowness, we find that our assumptions and beliefs are all too often prejudiced. Accordingly, we use our scientific reason in two ways.

- On the one hand, we can put our narrow perceptions together, thus building them up into broader pictures of the world. The world is thus described *objectively*, by relating objects in conceptual pictures. Through systematic reasoning, these pictures grow into coherent fields of knowledge. Each field of knowledge has its own consistency, as a conceptual system; and each field has its place among the other fields. In Sanskrit, these fields of knowledge are called 'vidyās' – from the root 'vid', which means to 'know' or to 'find'.
- On the other hand, in order to correct mistakes, our scientific reasoning can function in reverse. Instead of building pictures up, it can reflect back down, in order to investigate assumptions and beliefs. This reflective reason is essentially *subjective*. Its purpose is to educate, by asking questions that correct the questioner's own understanding. In Sanskrit, this corrective education is described by the word 'shāstra'. Literally, 'shāstra' means 'correction' or 'governance', but it is often used as a traditional word for 'science'. It thus conceives of 'science' as a correcting governance that is administered reflectively, through inward-turning reason.

These two ways of using reason have a long history of working together, since the beginnings of ancient science. But in the last few centuries, the objective way has been spectacularly developed, through an industrial revolution that started in Europe and has now spread to an international world. Unfortunately, the development has been one-sided. Our modern sciences have a one-sided tendency to emphasize the objective and calculating use of reason. So there has been a corresponding neglect of subjective education, where a reflective reasoning is used to clarify our living faculties. It could well be argued that our current environmental crisis comes from this neglect of a more deeply reflective education, which is now needed to make better use of our specialized objective capabilities. The neglect has gone so far that the word 'subjective' is routinely assumed to mean just 'personal', and a subjective use of reason is thus put outside the essential and proper functioning of science.

Since science is essentially concerned with the correctness of knowledge, it cannot be just personal. The problem is that our personal faculties are partial. They are partial faculties of body, sense and mind, which show us partial and differing appear-

ances. No such appearance is entirely correct. Each bodily or sensual or mental appearance needs correction, to allow for different points of view. In any science, this allowance is made by using reason to distinguish impersonal principles, which are shown in common by the differing appearances that different people see.

So an impersonal *standardization* is essential to all sciences. But it can be approached in two ways, which are again objective and subjective. The objective approach is directed externally – by prescribing standard techniques and instruments in the external world. The subjective approach is turned back in – through a reflective investigation of common principles that different people share, beneath the differing phenomena that nature manifests to them.

In the modern physical sciences that have developed in the last few centuries, the standardization is restrictedly objective. It requires that all theories are tested and applied through standardized instruments and machines, which we fabricate and use in the external world. Subjective reflection is specifically confined to the intuitive creation of ideas and theories. Once the theories are created, they must be tested and applied through their calculation of predicted results, which are measured and observed by a mechanical technology. The standardization here is achieved by a mechanical functioning that operates outside our living faculties.

Accordingly, there is a special restriction in the field to which our modern physical sciences apply. Their field of application is confined to a mechanical world that operates in structured space, outside the living faculties through which we observe it. Such sciences can't properly apply to the living processes that nature manifests, through a variety of meaningful phenomena, both in the world and in our personalities.

In older sciences, which have been developing for some thousands of years, more use is made of subjective reason, to achieve impersonality. Here, reason works through education. Ideas are tested and applied in a living process of learning from experience, through a reflective asking for common principles that underlie the variations of personality. An inner standardization is thus sought, by investigating back into a subjective depth of experience that we share in common, beneath our changing personalities.

The older sciences are based upon that inward investigation, towards a depth of knowing which is both subjective and impersonal. That depth of subjectivity is described by the Sanskrit words 'ātman' and 'ātmīya'.

The word 'ātman' means 'self'. It describes the self as a knowing subject at the inmost depth of personality, beneath the outward appearances of body, sense and mind. Accordingly, the word 'ātmīya' means 'subjective'. It refers to an inmost subjectivity, which is attained by reflecting back within.

But here, the word 'subjective' is not being used to mean just 'personal'. Here, personality is viewed as an outward covering, whose life expresses 'ātman' in the outside world. The self called 'ātman' is an inner principle of consciousness or spirit; and the word 'ātmīya' thus means 'spiritual'. It refers to a pure spirit that is found by inward detachment from outgoing personality.

Unfortunately, the word 'spiritual' has come to be associated somewhat exclusively with religious belief, and thus it often seems opposed to the open-minded questioning of scientific enquiry. But this appearance is not accurate, neither in India nor the West. The advance of Western science has deep roots in spiritual enquiry. The roots go back to ancient Greece, where the philosopher Parmenides made a sharp dis-

tinction. He said that there were two ways of learning: first, the way of 'aletheia' or 'truth'; and second, the way of 'doxa' or 'belief'.

Parmenides is quite scathing about the second way, the way of belief. He says that it produces confused and misleading appearances. In order to find truth, our habitual and customary beliefs must be rigorously examined, to remove what has been wrongly taken for granted.

A little later in Greek thought, essentially the same distinction is explained by Socrates, in relation to scientific reasoning. In Plato's dialogue, the *Republic*, Socrates presents his famous simile of the divided line. This simile is shown in figure 1, where the line is drawn vertically. On the left side of the line, Socrates distinguishes two kinds of learning. The lower and inferior kind is called 'doxa', which includes belief, opinion and appearance. The higher and superior kind is 'episteme', which implies a knowing and an understanding that has been refined by an intelligent examination of observed experience.

But the same distinction, between superficial appearance and truer consideration, can be further applied to each of the two kinds of learning that have now been distinguished. The result is a division of learning into four kinds, which are shown on the right hand side of the line.

- The lowest kind is 'eikasia' or 'illusion'. This is a deceptive appearance, created by fanciful imagination. Here, poetry and myth can sometimes help indirectly, by explicitly admitting that their interpretation must be metaphorical. Then they can inspire the suggestion of an underlying reality, beneath the illusion that is outwardly described.
- The second kind of learning is called 'pistis' or 'customary faith'. This is the habitual faith of long-accepted common sense. It's to this settled faith that people re-

Figure 1

Episteme (knowing, understanding)	*Noesis* –	Clarifying reason, dialectic argument, philosophy	Investigating beyond assumed beliefs
	Dianoia –	Formalized science, mathematics	Assumptions made explicit and systematic
Doxa (belief, opinion, appearance)	*Pistis* –	Common sense, habitual faith	Sober and customary
	Eikasia –	Illusion, imagination, myth	Deceptive or metaphorical

turn, when they sober down from their inspiring but fanciful flights of imagination. This kind of learning helps to correct some obvious errors of imagined fancy. But it depends on customary habits of belief that are not properly examined, and so it still remains in the realm of ‘doxa’ or ‘believed appearance’.

- The third kind of learning is called ‘dianoia’ or ‘formal science’. Here, learning is formalized by making its assumptions explicit, as in geometry and mathematics. The assumptions are stated formally, as axioms or postulates. And reasoned argument is used to deduce results which may be tested against actual observations. Thus, mere beliefs are left behind, and we enter the realm of ‘episteme’ or ‘investigated understanding’.
- The fourth kind of learning is called ‘noesis’ or ‘clarifying reason’. Here, the direction of argument turns back, from observed results towards accepted assumptions. Whenever observation shows that what’s assumed is incorrect, a further reflection is then needed, to uncover the offending falsity. As falsities are thus shown up and clarified repeatedly, the aim is a progression towards knowing what is true. For Socrates, this is the highest kind of reason, on the way to truth.

Thus, at the roots of science, in both India and the West, there is a reflective enquiry that may be described as ‘ātmīya’ or ‘spiritual’. The goal of this enquiry is to investigate a truth that is at once subjective and impersonal. That truth is sought by reflecting back, so deeply that all personal biases and partialities are left behind.

The older sciences are intimately connected with this spiritual investigation. From there, they conceive of nature in a much broader way than our modern physical sciences. In particular, they present us with ideas of ‘life’ and ‘mind’ that are inherently excluded from the calculating approach of modern physics.

Interpreting old sciences today

But there is a major problem here, as we try to interpret the old sciences and their ideas today. The problem is that they developed in traditional societies, before the use of printing.

In such societies, the manner of teaching was authoritarian. A text was passed down by reciting it and committing it to memory. So the first stage of education was to listen faithfully, to repeat the words and to remember. At this initial stage, there was no questioning. The attitude required was a faithful acceptance of recited texts that had to be remembered. The texts had thus to be accepted on authority, as saying something that was worth all this labour of reciting and remembering.

The questioning came later on, as a remembered text was quoted and interpreted. It was only at this later stage that a traditional student came to an independent-minded reasoning, to investigate the questions raised and to ascertain the truth of what was in the texts. And here, the questioning was meant to be all the more rigorous, for all the labour that had gone into reciting and remembering the texts.

In short, the traditional manner was authoritarian in the way that knowledge was expressed, through quoting and interpretation of authoritative texts. This was appropriate in traditional societies, where learning had to be approached by *remembering first and then questioning later on*.

But this authoritarian manner is misleading to us today, in the context of modern education. The problem is that our approach to learning has been radically changed, by printing and other media that we now use to record and convey information. Since

these media enable a far easier access to information, there is far less need for a modern student to develop formal memory. Thus, modern education can encourage questioning right from the start of learning. Instead of memorizing first and then questioning afterwards, our modern approach is quite the reverse. It is to *question first and to remember accordingly*, through an understanding that emerges from the questioning.

Because of this change in our approach, we tend to think that traditional learning was authoritarian through and through, from start to finish. We see that it started with a memorization where there was no room for questioning; and that tends to make us think that it must have continued in this way.

In particular, when we look at the old sciences, we tend to think that they are not based on any independent reasoning, but only on belief in the authority of ancient texts. And then it seems of course that they aren't real sciences at all. This impression comes about because of the traditional way in which they are still expressed, through quoting and commentary. In a modern context, this manner is inherently misleading, for two reasons:

- First, it seems to show that the old sciences are nothing more than systems of belief. To a modern reader, it all too easily appears that the old texts are making dogmatic statements, which the commentator elaborates, for students to accept on faith.
- And second, an impression is produced that the old sciences are tied to their particular texts and hence to their particular cultures. Accordingly, it seems that the old sciences must suffer inherently from cultural bias and partiality, without any proper means of enquiring towards a more universal and impartial knowledge.

These difficulties make it clear that the old manner of expression is no longer appropriate. In order to discuss the old sciences in a modern context, their ideas need to be described in a way that is independent of any particular text. Just as in modern physics, an investigating reason must enquire into common principles that different people share, independent of their particular personalities and cultures.

In modern India in particular, we currently inherit two, somewhat different streams of culture. One stream is a westernizing culture that is helping us to modernize our industry and institutions. The other stream is indigenous and rather older. It consists of our vernacular and classical traditions – into which we must naturally reflect, as we modernize more truly from within.

Before going on to discuss some traditional ideas, it may help to take a brief look at our historical context, with its two streams of modernizing tradition.

Western and Indian developments

Why did modern sciences develop so spectacularly in the West? Why not in India and in other ancient civilizations, where mathematics and some industrial technologies had been developing for rather longer and often with more sophistication than in the West?

In the development of Western science, there were of course many contributing factors. But two of them can be considered in particular. First, a Western emphasis on the *written word and external documents*. And second, a related emphasis on *organized institutions* that make use of such documentation in external media.

There is a sharp contrast here with the Indian tradition, where the emphasis has been on the *spoken or chanted word* and on an *individual relationship between teacher and student*.

The contrast goes far back in history and it continues to the present day. It is reflected in the differing histories of the West and India, as summarized in figure 2. Both in the West and India, we can consider four main periods: ancient, classical, medieval and modern. These periods correspond to similar stages of civilization, but the times at which they occur are different.

In the West, the *ancient period* goes back to the early development of civilizations in Iraq and Egypt. These civilizations were monumental. They used long-lasting stone to build great monuments, on which the achievements of kings and pharaohs were inscribed. Moreover, learning was documented in writing, on clay tablets in Iraq and on papyrus scrolls in Egypt.

Developments of learning *Figure 2*

In the West	In India
Ancient – up to 500 BCE No extensive tradition of chanted texts survives, with a recited accuracy that is comparable to the Vedas. Monumental civilizations of Iraq and Egypt, continuing into the classical period. Extensive written records in stone inscriptions, clay tablets and papyrus scrolls.	*Ancient – up to 500 BCE or earlier* Vedic tradition of chanted texts transmitted accurately by oral recitation, from how far back is very uncertain. Non-monumental Indus civilization, with cities and towns declining after 2000 BCE. Technological sophistication as in Iraq and Egypt, but written records all so brief that they cannot even be deciphered yet. ? Uncertainty of dating classic texts that mark the end of the ancient period.
Classical – 500 BCE to 450 CE Greek and Roman classics are written and preserved in libraries. Teaching gets organized through academies. Authority gets centralized, under the Roman empire. The corruption and fall of Rome results in a major break of classical tradition.	*Classical – from before 500 BCE to 900 CE* Sanskrit and Tamil classics are composed and taught through recitation. Teaching follows the 'guru-kula' ideal of individual transmission. Authority remains decentralized, in many different kingdoms and localities. Despite invasions that destroy many kingdoms and cities, classic learning passes on decentralized into the medieval and modern periods.
Medieval – 450 CE to 1500 CE The Christian faith is spread and organized by the Roman Catholic church, which thus establishes a centralized authority over faith and learning in the European middle ages.	*Medieval – 900 CE to 1850 CE* The bhakti movement brings faith into prominence. This develops many regional and vernacular traditions, which combine classic learning and more popular folk culture.
Modern – 1500 CE to the present Printing and Renaissance humanism work towards a scientific and industrial revolution, which spreads school and university education, thus encouraging liberal attitudes of free thought and self-reliant individuality.	*Modern – 1850 CE to the present* The use of printing and new media enables classic and vernacular learning to be taught in modern schools and universities, along with new science from the West. The challenge now is to interpret the old sciences in a modern way, as living disciplines whose reasoning enquires back into an impersonal depth of subjective experience.

In India, the ancient period goes back to the Vedas and to the Indus civilization. The Vedas were passed down by chanting them, in a very careful and systematic way that preserved their recited accuracy. Thus, they provide us with an early record of cultivated thought and description that was highly sophisticated in its own way, without the use of writing.

Like the Vedas, the Indus civilization shows a sophisticated knowledge and technology, somehow achieved with little or no use of writing. And further, also like the Vedas, the Indus culture was 'apauruṣheya' or 'impersonal'. It did not build monuments or leave written documents to commemorate its founders and its leaders, for their personal achievements in the world.

From archeological records, we know that the Indus civilization developed over a period of time that is very roughly similar to Iraq and Egypt. But we also know that the Indus civilization was quite a bit larger and that it came to an end rather earlier. Its towns and cities declined somewhat abruptly, soon after 2000 BCE, probably because of climate changes and the violent shifting of important rivers.

About the Vedas, there is an unsettled doubt, as to when they were written and transmitted. This doubt affects our current understanding of ancient Indian history. In particular, we are unsure how the Vedas were related to the Indus civilization. There is currently an unresolved dispute between two conflicting theories. On the one hand, the Aryan immigration theory says that the Vedas were composed after the decline of the Indus civilization, as a result of nomadic migrations from the northwest. But on the other hand, the Sarasvati theory says that the Vedas date back several thousand years earlier, because they were transmitted and compiled in the Indus civilization. According to this second theory, it was the drying of the vedic Sarasvati river that caused the decline of many towns and cities, whose ruins are now found on its dried-up bed.

This is a dispute that will take quite some time and quite some effort to resolve, including much gradual and painstaking research in extensive ruins that are yet to be excavated. So currently, while the dispute continues, there is a huge uncertainty in our dating of early Indian history.

In the history of the West, the *classical period* is relatively easy to date and to identify. It started in Greece, some five centuries before the birth of Christ; and it went on for about a thousand years until the fall of Rome. During this period, the Greek and Roman classics were composed and written and preserved in libraries, as for example in the great library of Alexandria in northern Egypt.

But in the history of India, the classical period is harder to pin down. It is of course the period in which the Sanskrit classics were composed, but how we date these texts is problematic. For those who follow the Aryan immigration theory, there is a tendency to date the Sanskrit classics back to Indo-gangetic towns and cities that were roughly contemporary with classical Greece. But the Sarasvati theory would throw that dating into question and might shift it further back, perhaps considerably.

Since Sanskrit learning was transmitted so much through recitation, with so little dependence on writing and libraries, it would not have been so dependent on towns and cities as the classical scholarship of Greece and Rome. Thus, classic Sanskrit learning could have very well extended back before the Indo-gangetic civilization, into the preceding period when there were less towns and cities. Some major Sanskrit texts may need to be dated further back into this period than the Aryan immigration theory has allowed. And we may need to think of India's classic period as developing

through a somewhat longer and more sustained accumulation from an ancient cultural inheritance. Such a long and sustained development is reported by all of India's major traditions – Hindu, Jain and Buddhist. But of course, it remains to be seen how far they are correct.

Despite the uncertainties, one thing is clear. India's classic period lasted longer than its equivalent in the West. It started at least as early; and it went on until about 900 CE, some four or five hundred years after the fall of Rome. Moreover, as the classic period gave way to a medieval one, the destruction of old learning was far less in India than it had been in Europe.

The problem in Europe was imperial domination, by the military force of Rome. When Rome became corrupted and eventually fell to marauding barbarians, its fall resulted in a relatively major disruption of the European tradition. That led to a period called the 'dark ages', where bits and pieces of the old learning were preserved and re-interpreted by the Christian church. The church thus came to take the lead, and even associated itself with a 'Holy Roman Empire'. It functioned from the old city of Rome, to propagate and organize a medieval culture that demanded a religious faith in the centralized authority of Rome.

By contrast, in India, political and cultural authority were more decentralized. They were carried forward in many varied kingdoms, from north to south and east to west. Classical learning was not tied so much to city centres and large institutions. Instead the emphasis remained upon the guru-kula ideal, with its individual transmission of learning from teacher to student. As in Europe, violent invasions disrupted a classical civilization and thus brought about a medieval period. Many temples and cities and institutions were destroyed, but there was nowhere near such a major break of culture and tradition as in Europe with the fall of Rome.

Accordingly, in India, classical and ancient learning was far more substantially continued than in the West. It has continued through a very rich medieval period, where 'bhakti' or 'religious faith' has come into prominence and many vernacular traditions have formed. The transmission here has been largely decentralized and local, maintained by individual teachers and families, who have carried it on in various different ways at many different locations, in sannyāsi seclusion or in the householder life of villages or towns or cities.

But in India, the medieval period starts and ends rather later than in Europe. The European medieval period is approximately from the 5^{th} to the 15^{th} centuries CE. In India, it is roughly from the 9^{th} to the 19^{th} centuries CE. For it is the use of printing that brings about the end of the medieval period and the beginning of that cultural revolution which we call 'modernization'.

The use of printing was introduced in 15^{th} century Europe, with the Gutenberg bible. That brings about the beginning of the modern period in the West. But it is only in the 19^{th} century that Indian traditions have begun to modernize, through the use of printing and other modern media. In the last century and a half, this use of modern media has brought about the same kind of cultural revolution that took place rather earlier in modern Europe.

The new communications have enabled information to spread much faster and more widely through society, so that new opportunities have opened up. After many centuries of medieval resignation to the ills of a troubled world, there is a fresh spirit of self-reliance and independent-minded reason – which has now become appropriate, in order to take advantage of the new opportunities. New questions of reform are

raised; and they stimulate a faster pace of change, in an unsettling process of transition from a medieval to a modern mind-set. In hitherto medieval communities, society has tended to depend upon an obedient acceptance of past tradition. But that approach is changing fast, in a modern world where individuals are more directly encouraged to ask questions and to try things out for themselves.

Thus, in India, our medieval past is relatively recent. Our medieval period came to an end about a century and a half ago, as compared with five centuries ago for Europe. We are still in a process of transition, caught up in an unresolved mixture of the medieval and the modern. On the one hand, we have a very rich inheritance of traditional sciences that remain in living practice. But on the other hand, these old sciences still tend to be expressed in an authoritarian way that is unsuited to the open-minded questioning of modern education.

The development of modern science has been enabled in the West, through the Western emphasis on external records and organized institutions. That emphasis enabled the extensive use of printing and modern media; and it has enabled the spread of education through modern universities and schools. It is through these developments, in media and institutions, that modern sciences have come about, in the last five centuries of modern Western history.

In the West, the introduction of printing came at the start of the Renaissance, with its rebirth of interest in classical learning and the human individual. Then came the industrial revolution, with its development of mechanical technology. That technological development accompanied the founding of modern physics, by scientists like Descartes and Newton. Then came the Enlightenment, with its free-thinking liberalism. And later on came further advances in modern physics, through Einstein's questioning of relative measurements in space and time.

There have thus been five centuries of major development and upheaval in the modernizing West – culminating in today's computerizing technology, and in our current environmental crisis. In India, similar developments and upheavals have been taking place over the last century and a half, to some extent by imitating and importing learning from the West. But more essentially, such importing only works in the context of our own development, as we inherit learning and make use of it ourselves.

Our major inheritance in India is our living tradition, which carries on unbroken from an ancient past. That inheritance is particularly rich in its inward sciences of life and mind, which are applied through reflective reason and subjective education. But since these sciences still tend to be expressed in a medieval way, some delicate and careful work is required to interpret them in modern terms. In particular, their basic ideas need some attempt at modern explanation, in relation to external sciences that have more recently developed in the West.

Such an explanation is a tricky business, which must negotiate some difficult and unsettling questions. But that's what will be tried in the talks that follow.

Language and tradition

The living word

In the previous talk, two kinds of reason have been distinguished: objective and subjective.

- *Objective reason* uses symbols in a calculating way, to predict the result of objective action. Here, objects are represented by symbols. And symbols are related together, so as to represent relationships between objects. We thus construct objective descriptions, which represent a structured world. These descriptions are then used to calculate effective actions that will bring about predicted results.

  For example, this is how a traveller may use a map – so as to calculate what route should be taken, and what timetable should be planned, on the way towards a predicted destination.

- *Subjective reasoning* makes quite a different use of symbols and descriptions. They are not treated here as calculating instruments, but instead as expressions of a consciousness that gives them life and meaning. So they are treated as alive; and they are understood reflectively, by investigating back towards the knowing they express.

  The questioning asks what has been assumed in our descriptions; and it thus uncovers mistaken assumptions that prejudice our understanding and our faculties. The application of this reasoning is educational. It leads to clearer understanding and less biased faculties, which are in turn expressed through more accurate and sensible descriptions.

  For example, while a map may be used to calculate, it can also be used to reflect about the layout of a territory. Then it helps a traveller to develop a better sense of direction – in relation to orienting landmarks, to the routes of travel, and to the regions and the obstacles that have to be traversed. We thus use maps that we draw and re-draw, to express and reflect upon our understanding of a territory.

  Through this reflective reasoning, we clarify our living capabilities, which enable us to find our way and to go about the business of our lives.

These two ways of reasoning are associated with two views of language and description. The objective view sees names as an artificial convention, by which we label symbols and the objects that they represent. The subjective view sees names as natural expressions of a living meaning, which is inherent in our use of language.

In modern physical sciences, which emphasize objective reasoning, names are viewed primarily as artificial labels, which can be chosen independently of their previous usage and their spoken sound.

However, in the older sciences, which make more use of subjective reasoning, there is a rather different approach to language and tradition. Here, language is treated as alive. It's seen to have evolved as a living expression of underlying consciousness, which has continued from the past. Names are seen as living words, whose meaning is inherent in their spoken sound.

When names are written on a map, they are used as mere labels, to specify the places that are represented by symbols on the map. The map is drawn so that it forms a symbolic structure, which corresponds to the structure of a represented territory. As

names are read on a map, their meaning is interpreted primarily through the structure that they form, in a world of structured space.

A spoken word is meaningful in quite a different way. Its meaning does not work primarily through structure, in a world of outside space. The meaning of a spoken word depends upon a living process, of learning from experience. That process works through time and history. And it essentially involves the minds and living faculties of those who speak and listen.

As a spoken word is heard, it *evokes* a meaning from the listener. The meaning is evoked through feelings, thoughts and perceptions – which arise in the listening mind, in response to the sound that has been heard.

Sound and seeing

But how does sound evoke a meaningful response? When words are said, what effects do they produce, in the mind of someone who is listening?

One effect is immediate. It comes from the shape and quality of sound, as pronounced by the speaker. This is the same effect that is produced by listening to music. The passing shapes of sound affect the hearing mind. They act upon the mind so as to influence attention, energy and mood. Here, sound is used to induce a subtle influence, upon the state of hearing mind. Where sound is thus directly used, for its subtle influence, it is described by the Sanskrit word 'mantra', which means a 'mental device'.

As shapes and sounds of words are heard, they are also interpreted to have a meaning, by which something more is seen. This interpretation is an inward seeing. As the mind interprets meaning, it reflects attention back, beneath the sounds that come and go. The meaning that's interpreted is taken into understanding, at the depth of mind. There, a quiet knowing carries on, assimilating meaning at the background of experience.

Thus, beneath its changing shapes and sounds, language has a second effect, which provokes a reflective seeing in the mind. The listening mind is here provoked to ask for meaning, as it interprets what is said. This provoking effect is described by the Sanskrit word 'vicāra', which means 'thought' and 'enquiry'.

In the practice of traditional learning, both effects are highly developed, in our use of language.

- The *mantra* effect is one of subtle force and power, through which the sound of words impels the hearing mind to change its state in some specific way.
- The *vicāra* effect is one of reflective thought and enquiry, through which the meaning of words is considered and questioned.

In short, the *mantra* effect is sheer force of sound; the *vicāra* effect is reflective seeing.

Both these effects are meant to be intensified by repetition. By repeated recitation, the mind is meant to focus more intently on the shape of sound, and thus to get thrown further and further towards the change of state intended by the mantra effect. By repeated reflection, there is meant to be a progressive investigation of meaning – as the mind keeps questioning and clarifying its own assumptions, so as to go deeper and deeper into the meaning of what is said.

As the repetition continues, both effects are meant to reinforce each other. The mantra sound induces an altered state of mind, which is meant to go together with a

reflective enquiry into clearer seeing. Through continued repetition, both sound and seeing are meant to get increasingly internalized, until they reach a meeting point where the internalization is complete.

- The *sound* proceeds from recitation with the mouth to recitation in the mind. Then in the mind, the sound is meant to proceed from explicit forms and names of thought to tacit qualities and values of feeling – which go further and further down, into the background of experience. The eventual aim is the background itself. The idea is that there, at the background, the sound of speech dissolves into its silent essence. That is its living source. From there, expression is inspired – in a way that is completely natural and spontaneous, quite free from all the deliberated artificiality of thoughts and words.
- For *seeing* to be clarified, mere verbal argument must lead to genuine questioning, of prejudiced and preconceived assumptions. The eventual aim is to get beneath all prejudice and preconception – so that one comes to a pure seeing, at an inmost ground where no assumptions prejudice or preconceive what's seen.

The meeting point of sound and seeing is meant to be found there, at that inmost ground from which all sounds and seeings come.

From a narrowly 'modern' point of view, we think of 'learning by heart' as a merely formal and unthinking memorization, which does not bother to question what has been slavishly memorized. But the same phrase, 'learning by heart', has a more basic meaning, which is essential to traditional learning. It refers to a sustained process of absorbing both the sound and meaning of a text into the depth of one's own heart, far beneath the outward forms of recitation and the deliberated interpretations of thought.

Such 'learning by heart' is far from a lazy or a slavish imitation. Instead, it is a matter of making the text one's own, and coming to its knowledge for oneself. That requires an intensive familiarization with the text, and a relentless questioning of what it says. The learning process is designed to be sustained until the text is fully familiar and its meaning is perfectly clear. In the course of time, the familiarization must be so thorough and the questioning so rigorous that what is learned goes far beneath all passing words and thoughts. The long term aim is thus an independent understanding that is spontaneously expressed in what an individual feels and thinks and does, in her or his own right.

The mantra 'om'

At the roots of the Hindu tradition, the Vedas are valued for their mantra power. And the Upaniṣhads are valued for their vicāra questioning. It is for their mantra power that the Vedas were so carefully preserved, with such exactness in maintaining their chanted sounds. And it is in the Upaniṣhads that mantras are so plainly and concisely used, in the reflective direction of vicāra enquiry.

One mantra, in particular, is valued both for its forceful shape of chanted sound and for its brevity as it is used in vicāra questioning. This is the mantra 'om'. Because it is so short and powerful, it is described as a 'bījākṣhara' or a 'seed syllable'.

In this description, the word 'akṣhara' is especially significant. It comes from the root 'kṣhar' – which means to 'flow', to 'melt away', to 'change'. So, in its root meaning, 'akṣhara' means changeless. From that root meaning, the same word 'ak-

ṣhara' is applied to the technicalities of language, where it is used to describe a 'letter of the alphabet' or a 'syllable of spoken sound'.

Of course, as a person speaks, letters, syllables and words are heard as passing sounds, which keep on changing all the time. But, as such sounds of language pass, each represents a changeless something – which can later reappear, as a repetition of the same thing. We imply such a changeless something every time we recognize some sound, as a letter or a syllable or a word that we have heard before. It is then the *same* letter or the *same* syllable or the *same* word that has already been heard – though spoken differently – on previous occasions. Thus, behind the passing sounds of speech, we somehow recognize particular letters and syllables and words that stay the same. This 'sameness' is essentially implied, whenever the word 'akṣhara' is used.

One syllable, in particular, is described as 'akṣhara'. It is *the* akṣhara: the one, unchanging syllable that signifies all speech, all expression and creation, all experience. That syllable is 'om'. It reflects back, from the formal standardization of outward syllables, towards an inner changelessness at the underlying background of experience. And this reflection back is not just an artificial convention. It is latent naturally, in the actual sound of 'om'. The very shape of its sound is such that when it is recited, it directs the listening mind into the underlying background.

Through the science of 'shikṣhā' or 'phonetics', it is explained how 'om' has a shape of sound that works reflectively upon the mind. Phonetically, the sound of 'om' is analysed into three elements: 'a', 'u' and 'mmm…'.[2] This analysis is not just theoretical. 'Om' can be pronounced in a prolonged way – with an initial 'a' sound merging gradually into an 'u' and then into an 'mmm…', which fades finally into silence. The 'a' and 'u' sounds coalesce to form an 'o', and then they join into the 'mmm…', thus forming 'om'.

But, as the sound of 'om' is chanted, it goes on to a final coalescence, in which the sound of chanting merges back into silence. In that merging back, sound and silence coalesce, to show a common background that stays present in each of them.

As 'om' is chanted, the initial 'a' emerges imperceptibly from silence. Then it goes on to merge with the subsequent 'u', which in turn gets merged into the humming sound of 'mmm...'. This humming sound continues from the 'u', into an imperceptible merging of spoken sound and unspoken silence. The whole point is to emphasize a sense of background continuity, which carries on quite undisturbed, beneath the rising and the falling of changing sound.

In this experience of progressing sound, the coalescing elements may be interpreted philosophically, as different states of experience.

- 'A' represents the waking state – where our minds and senses see objects, in an outside world. Here experience has an outside and an inside. There is a world of space and time outside, perceived through a stream of perceptions, thoughts and feelings in each person's mind.
- 'U' represents the dream state – where our minds imagine an apparent world, made up of their own thoughts and feelings. Here, experience has an inside, but no outside. All objects in a dream are in the dreaming mind. There is no world of space and time outside, but only a succession of dream appearances that come and go in mind.
- The humming sound 'mmm…' represents the deep sleep state, where there are no appearances – neither in an outside world, nor within some inner mind. Here, there

is no sense of outside or inside. There is no distribution of objects in space, no flow of happenings, no passing states of time. There's only pure experience, quite undivided and undisturbed by any seen activity.

Viewed from the waking state, deep sleep can be quite paradoxical. On the one hand, it seems to be quite blank and empty, and therefore negative. But on the other hand, there must be something positive in its quiet experience; because we keep returning there, to relax from physical and mental activity. As we fall into deep sleep, our thoughts and minds become dissolved in it; and we often wake refreshed, with a clearer and more settled understanding. That's why we sometimes talk of 'sleeping on' a problem, as a way of solving it.

Thus, despite the seeming blankness of deep sleep, it has an intimate connection with the absorption of perceptions, thoughts and feelings into settled understanding. Beneath its negative appearance, the deep sleep state has a profound capacity for assimilating mental activity, into a quiet understanding that continues at the background of experience. From a subjective point of view, deep sleep is just that state where our various objects and activities become absorbed, into a quiet background that stays present through them all.

That is why, as 'om' is chanted, the deep sleep state is represented by the 'mmm…' sound, which carries on from changing resonation into quiet stillness. As the sound trails off and merges into stillness, a listener is meant follow it – emphatically and carefully – into the changeless background.

The growth of tradition

However, when the mantra 'om' is analysed in this way, the analysis can give a misleading impression. It can give the impression that the mantra was seen as an artificial device, which was constructed for the purpose of signifying an intellectual analysis. This impression would make it seem that the intellectual analysis of the three states came first; then the letters 'a', 'u' and 'mmm…' were chosen to represent these states; and finally the letters were joined together in the sound 'om'.

Actually, the traditional conception is just the opposite. 'Om' is considered to be a very ancient 'bījākṣhara' or 'seed syllable'. As such, it was first discovered by some very early Riṣhi or sage, who had fallen deeply back into the changeless background of our shared experience. From there, the mantra 'om' emerged – as a single sound, with a profound significance. And that significance became elaborated later on, progressively, in the course of long tradition – as the texts were composed and as the shāstras or sciences were organized to explain them analytically.

In the tradition of texts and shāstras, explanations and analysis are progressively elaborated. Traditional scholars tell us that the Vedas often make an implicit reference to the syllable 'om', in many passages where the word 'akṣhara' is used. In some of the earlier Upaniṣhads (particularly the *Chāndogya*), 'om' is explicitly described as a beginning and ending syllable of vedic chanting: a syllable associated with threefold knowledge and thus signifying everything. In the *Prashna Upaniṣhad* (5.1-7), it is described as a symbol with three elements for meditation: in which one element leads to greatness in the changing world of human beings; two elements together lead to expansion in an intermediate world associated with the mind; and all three elements together lead to an ultimate principle of light itself, represented by the sun.

In the *Māṇḍūkya Upaniṣhad*, the entire text of twelve stanzas is devoted to a concise, but analytic discussion of the mantra 'om' – how it represents three states of experience and an unvoiced reality that underlies them all. Subsequently, Shrī Gauḍapāda composed a *kārikā* – of which one chapter comments on the verses of the *Māṇḍūkya Upaniṣhad*, and the remaining three chapters extend the analysis to a systematic exposition of non-dual philosophy. After that, Shrī Shankara composed a *bhāshya* commentary, further explaining both the *Māṇḍūkya* verses and Gauḍapāda's *kārikā* on them.

Moreover, to the present day, the syllable 'om', the *Māṇḍūkya Upaniṣhad* and its various commentaries continue to be further discussed and explained. All this growth of reasoning and explanation is manifested forth from the implicit potency contained within the sound 'om' – just as a many-branching tree, with all its leaves and blossoms, is manifested from the living essence of a seed.

This is how the tradition grows and develops, according to its own conception. A living source of timeless knowledge is expressed in germinating seeds of culture, which grow into our built-up structures of religion and art, technology and science. It is in this sense that traditional scholars sometimes say that the Vedas inherently contain all cultural and scientific developments. They are then thinking of the Vedas (including those lost or undiscovered) as comprising all the seeds that sages may discover by going back into the depth of their experience.

When this kind of thinking is interpreted dogmatically, it can of course get very complicated and mysterious. But in its essence it is simple and straightforward. The essence of this thinking is a timeless ground to which each individual may return. It is a ground that's shared in common, by everyone. Each individual can investigate it independently, by an individual questioning of one's own experience. Conceiving that unchanging ground as knowledge in itself, all cultural and scientific developments are then conceived as its changing expressions.

Over the course of many generations, the expressions are built up – in religious, artistic, technological and scientific institutions. But this development depends upon the ever-present ground of living experience, from where the forms of knowledge are renewed and come alive. All genuine developments are inspired from that living ground; and so they are best carried out by sages who have come to oneness with that ground and stand established there.

In its own view, the whole tradition rises from the realization of its guiding sages. Their knowledge, in the end, is individual. But it is utterly impersonal as well. It's taught from one individual to another, as a return to common ground – beyond all personality, beneath all social and cultural institutions.

Levels of expression

There is of course a problem with this ancient view, of language and tradition. We come across this view in many old traditions, as we inherit them in the modern world. In India in particular, this view is explicitly described, in some traditions that are very much alive today.

But here we are told that all our descriptions and all our sciences are in the end subjective. They are all based upon a subjective knowing in each individual. So science must essentially remain subjective – no matter how far we may standardize our sciences, through all the technical and instrumental standards that we maintain, in all the institutes and the associations that we organize collectively.

Moreover, we are even told that everything achieved by science does no more than express this subjective and individual knowing. How can this be reconciled with the obvious capabilities that modern science has achieved, by testing and applying its ideas through objective instruments and machines? Modern science has achieved results precisely by excluding our mental and personal faculties from its testing and application. How can that be so, if its knowledge is essentially subjective?

The problem here is how to reconcile objective results with subjective knowing. This is an old problem – which has been investigated by distinguishing three levels of expression, in our use of language. The distinction is made in Bhartṛihari's *Vākyapadīya*. It is a standard text, in the old science of Sanskrit linguistics.

Bhartṛihari's levels are described in figure 3. In their essence they are very simple. As shown in the first column, on the left, they are the levels of body, mind and consciousness.

But after Bhartṛihari, the levels were elaborated a little, by distinguishing two aspects of consciousness. So there is now a fourfold distinction, with three levels of expression rising from an underlying ground. This is shown from the second column onwards, to the right.

- The uppermost level is our outside world of space and structure, seen through our bodies. Here, meaning is articulated, in symbols that are joined into elaborated structures. This is the level called '*vaikharī*'.
- The second level is a succession of passing states, which each of us experiences in time. For every one of us, the world of objects is conceived in this way, through a succession of replacing states that come and go in mind. Each moment brings a state of mind; and as each moment is replaced by other moments, every state of mind becomes replaced by other states that follow on in time. Here, meaning is drawn out and interpreted, as our feelings and our thoughts keep on expressing consciousness and reflecting back to it. A changing stream of mind thus mediates between our inner knowing and the objects we perceive. This mediating level is called '*madhyamā*'.
- Beneath the changing states of mind, we experience a continued consciousness, of cause that carries on through time. Such cause must carry on unmanifest, as a quiet potency implying tacit aptitudes and capabilities that may be manifested later on. Here, continuity is carried by a silent depth of insight, where changing states of

Figure 3

Body	Space	Co-existing points	World of objects	Elaborated structure, perceived by body
Mind	Time	Replacing moments	Succession of states	Mediating process, conceived by mind
Consciousness	Causality	Continued consequence	Assimilating capability	Silent seeing, at the depth of insight
	Knowing in identity			

surface mind are taken into lasting knowledge. This is the level of inner seeing, called '*pashyantī*'.

- Beneath all changes and all continuities, there is an underlying ground, from where our knowing is expressed. That ground is a consciousness whose very being is to know. It's only known in identity, by returning back to what it is. That final ground is what came to be called '*parā*' or 'ultimate'. It is the same for everyone, beneath all differences of personality. So it is *both subjective and impersonal*. It is a common ground on which all sciences are ultimately based.

If you think about this analysis, you can easily see that it is essentially the same as the analysis that is made in the *Māṇḍūkya Upaniṣhad*, by interpreting the mantra 'om'.

- The waking state is seen through body; and so it corresponds to *vaikharī*, where language is expressed in objective structure.
- The dream state is conceived by mind; and so it corresponds to *madhyamā*, where language gets expressed through a succession of mental states.
- The state of deep sleep is experienced quietly, when all appearances are absorbed into underlying consciousness; so that deep sleep corresponds to *pashyantī*, where all perceptions and conceptions are assimilated into silent seeing at the depth of insight.
- The background of all states is experienced by itself, by simply being what it is. In the analysis of the *Māṇḍūkya Upaniṣhad*, that background is called 'caturtha' or 'turīya' or the 'fourth'. It corresponds to *parā* – the final ground where there is no change or difference, beyond the comings and the goings of the three states.

In this analysis, objective reason is restricted to the level of '*vaikharī*' or 'elaborated structure'. As reasoning is used objectively, it can only work through structured pictures, which describe a world of structured space. This method does not properly apply to the living functions and the living processes that nature manifests to us, in our lives and minds.

Where life and mind are recognized, we are no longer describing nature as a structured world, constructed from objective elements. Instead, we recognize that an underlying consciousness has somehow been expressed in the structured world. And we understand that expression by reflecting back, through our minds and faculties, into an underlying depth of consciousness in our experience.

As we reflect, deeper levels are uncovered and described. In the old sciences of life and mind, many levels are described – as various different stages through which consciousness becomes expressed in the external world. In the analysis above, there are three levels which become elaborated into four. But this is only one example. For the purposes of various different sciences, the levels can be differently analysed, often more elaborately.

As modern physics has developed in the last few centuries, there has also been a discovery of different levels at which nature manifests phenomena. In a way, these levels of modern physics are similar to those in the old sciences. As the levels go down, they get more and more subtle. The uppermost level is the material world; but, as the levels get deeper, they get less and less material.

Modern physics has been greatly advanced by this de-materialization. In this way, it can help to understand the old sciences. This will be the subject of the following talk. But a warning is needed here. In another way, modern physics is quite different

from the older sciences. It cannot rightly describe its levels as expressing a subjective consciousness. That expression is outside its field of study.

Levels of modern physics

In this talk, there'll be a brief discussion of modern physics, at five levels of consideration. These levels are summarized in figure 4. In a way, they are related to the old sciences, but that relationship will be discussed in later talks. For now, these levels will be discussed one by one, as they relate to our modern ways of thinking about the external world.

Newtonian objects

As modern physics investigates the world, it starts with a description of material objects, like tables and chairs. These are the objects of Newtonian physics. Newton's laws apply to them. Each such object is located in space. But, as time passes, objects can get moved in space; and so their locations can change.

In this Newtonian view, the world is described through static or dynamic structures, which are constructed from fixed or moving parts. Each part is a material ob-

Five levels of modern physics *Figure 4*

Newtonian objects	Pieces of matter, located in space and moving in time.	Objects interact through force, thus forming a material world of static and dynamic structures. These structures work mechanically, like a machine that is made up of interacting parts.
Quantum states	Changing states, in evolving systems of mechanical activity.	As quantum systems interact, they get disturbed, jerkily and unpredictably. They also get disturbed by our observing instruments, so that our observations are inherently discontinuous and uncertain.
Relative observations	Observations of space, time and matter. They are made differently by different observers.	Though observations vary from one observer to another, they show invariant principles – like the speed of light – which are the same for all observers. These principles are governed by basic laws – like the laws of electro-magnetics – which take part in a universal functioning of nature.
Fields of force	Fields that condition space and time; so as to exert a driving force on particular objects, at the place and time where each object is found.	As shown in the theory of quantum fields, all space and time are filled with huge fluctuations of momentum and energy. As these fluctuations take place, they are bunched very close together, in space. And they are very rapid, as they come and go in time. They are so minutely close and so blindingly rapid that our instruments cannot detect them directly. But they have an overall effect which can be detected, as various kinds of force that get to be exerted on the objects we observe.
The space-time continuum	The continuity through which each event is connected to others, in a four-dimensional geometry of space and time.	As shown in the theory of relativity, gravity can be described on the basis of a rather simple principle. When an object moves in a gravitational field, its line of travel is quite straight and therefore quite unforced, in the space-time continuum. But lines that are straight in four dimensions may appear to be bent, when they are viewed through a changing world of three-dimensional space. Then it appears that motion has been forced into changing its speed or its direction. This appearance of forced motion is a superficial show. It arises from a background continuity that is more fundamental. There, nature is connected geometrically, beneath all mechanisms that appear to work through interacting force.

ject, which acts on other objects and reacts to them. This interaction takes place through various kinds of force, which objects can exert upon each other.

Newtonian objects are thus differentiated pieces of matter, which interact through mutual force, in static or dynamic structures. The universe is here described as an evolving structure of stars and galaxies. The solar system is described as planets orbiting the sun. The planet earth is described as a spinning ball with geographic and climatic structures of land and water and atmosphere. Solid things, like mountains and rocks, are described as forms of material structure that are relatively static. Fluid things, like rivers or winds or clouds, are described as faster-moving structures of material flow.

Through this approach, many structures in the world have been described, with an extraordinary degree of mathematical precision. That precision has enabled a progressive development of standard instruments and machines, which are manufactured by an industrial technology. As the instruments and the machines develop, they extend our observations and our capabilities in the material world.

At the present time, our industrial technology is very largely based on the material approach of Newtonian physics. This approach works very well in describing a great part of the material world that we see around us, through our bodies and their instruments.

But Newtonian physics does not work at tiny scales of size, as we get down to the scale of atoms or smaller. Nor does it work at high speeds, which get near the speed of light. It fails again at enormous scales of size, where we consider whole galaxies. and larger. And it also fails where gravitation is intense, as in a black hole.

These failures are addressed at deeper levels of consideration.

Quantum states

In our material observations of the world, there is an obvious problem. Through our senses, we observe things partially. So we get partial views that depend on who is looking and how.

For a particular example, consider an ordinary dining table. Viewed through our unaided senses, the table appears to be a solid piece of matter, with a smooth and flat top. But if the table is examined through a microscope, irregularities and holes appear, showing that the stone is not smooth and solid, as it appears to our unaided senses. Looking more closely, at greater magnification, another view appears. Here, it is shown that the table is made up of finer structures, which are in a state of agitated motion. These finer structures are made up of molecules – which keep vibrating rapidly, in a way that our senses register as temperature.

The molecules, in turn, have an even finer structure, which is responsible for the chemical properties of matter. And this molecular structure is made of atoms. But, when atoms are investigated in their turn, we get a view of them that is quite strange and paradoxical.

At its centre, each atom has a tiny nucleus, where nearly all its matter is concentrated. The nucleus has an electric charge, which is positive. Around the nucleus, there is an outer shell, which is made up of negatively charged electrons. The positive and negative charges are usually balanced; so that they cancel each other out, in ordinary matter that appears uncharged.

It Newtonian physics is applied to this atomic structure, it is clear that an atom must be like our solar system, with electrons orbiting the nucleus. But a baffling prob-

lem arises here. According to the laws of electro-magnetics, electronic orbits are inherently unstable. An orbiting electron must lose energy, by radiating light. As it loses energy, the electron must fall into the nucleus, within a fraction of a second. Newtonian physics thus fails badly, to explain atomic structure.

At this point, quantum physics changes the approach. It goes on from material structure, to a further consideration of transforming activity. An atom is no longer considered as a mere structure of material particles. Instead, it is described as a system of activity, which transforms through a succession of evolving states. An electron is no longer considered as a tiny piece of matter. Instead, it is a systemic element, of atomic activity. Through this systemic element, called an 'electron', an atom may transform its state of energy, by radiating or absorbing light.

In the descriptions of quantum physics, energy is sometimes discontinuous. An electron may suddenly absorb a discontinuous quantum of light energy. The electron then jumps suddenly, from one state of energy to another. These sudden jumps occur when one system of activity is thought to interact with another, in a way that is materially interpreted. As for example in this case, when particles or waves of light are thought to be absorbed by orbiting electrons.

However, when a quantum system is described by itself, there are no discontinuous jumps. The system then evolves with a perfect continuity – as described through a complex mathematics of continued variables that are not jerked about, from one moment to the next. The sudden jumps are only needed when the mathematics is interpreted materially, in order to describe our material observations.

Thus, in quantum physics, there are two different kinds of description. One kind is used for complicated systems of activity, which evolve precisely and continuously. The other kind is used for our material observations – which are often uncertain and jerky, in a way that we can't properly control.

As quantum systems are observed, they get disturbed by the instruments through which we observe them. These instruments are not defined by quantum theory, as evolving systems of activity. The theory takes it for granted that there are such instruments, and it leaves them undescribed. In actual practice, the instruments we use today are specified in a mainly Newtonian way, as structures that are made from material components.

In short, there is an inherent mismatch, between our material instruments and what they observe. Crude instruments are being used to observe more subtle systems of activity, which are described through a highly complex mathematics. It is thus only natural that such observation cannot properly control the disturbing effect of its material instruments. The uncontrolled disturbance must result in a corresponding jerkiness and fuzziness, in the observations that are made.

In order to arrive at its complex descriptions, quantum physics works through a curious procedure, which is called 'quantization'. It starts with established descriptions that have proved to be effective, where the disturbing effect of our material measurements is small. And then, these established descriptions are deliberately complicated; so as to allow for discontinuities and uncertainties that have now come to be expected, where our material measurements become unavoidably disturbing.

As quantum physics complicates our familiar pictures of material structure, it produces difficult and paradoxical ideas. But, despite this difficulty, it has been very successful. It predicts results that are amazingly accurate; and it has been very useful in developing new technologies. In particular, it is prominently used in nuclear technol-

ogy, in semiconductors and electronics, in the design of material substances and processes, in atomic and molecular chemistry, in lasers, superconductors, low temperature applications, and in making a wide range of instruments that are extremely accurate in their abilities to measure and control.

But quantum physics has an inherent limitation. Its complications have a tendency to get out of hand, as it is applied to more complex situations, at increasing scales of size. By quantizing electromagnetic and Newtonian descriptions, the movement of light and subatomic particles has been quite effectively described. So also the behaviour of atoms and small molecules. But, for larger molecules, the increasing complications are still a major obstacle, which has not yet been overcome.

In particular, quantum physics is not yet effective in describing very large molecules, like DNA. At the present time, molecular biology is still Newtonian, to a very large extent. It still depends on Newtonian descriptions – which are crudely material, and will somehow need to be refined.

Relative observations

In quantum physics, our material observations are refined by investigating things more minutely, at decreasing scales of size. But a further refinement is needed – to take into account the different views of differing observers, who move about in space and time.

We often take it for granted that matter, space and time are three different things, each of which exists in its own right. Matter is what objects are made of. Each object is contained in space. So space is a universal container, in which objects are related together, at each moment of time. As moments pass, objects move and interact, in changing systems of activity. So time is a universal progression of moments, through which the world is formed and changed.

This way of thinking seems, at first, to be plain common sense. In particular, it seems plain common sense that space and time are universal, that they are the same for everyone. But in the theory of relativity, modern physics shows that this common sense breaks down. In particular, it breaks down when we investigate the speed of light.

As described in the laws of electro-magnetics, light is a form of energy that is conveyed in waves of electric and magnetic potential. This potential stays present in empty space, where no matter is found. So it is an inherent property of space itself. Because of this inherent property, light can travel in a vacuum tube, where air has been pumped out. And, for the same reason, light can come to us from the sun and the stars, through vast regions of empty space that are found beyond the earth’s atmosphere.

Thus, space is not merely an empty container, for the objects that are found in it. It has inherent properties that convey energy and information. According to the laws of electro-magnetics, the speed of light is fixed by these inherent properties, of space itself. But the laws of electro-magnetics are fundamental. They are basic laws of physics, which should be the same for each observer. And so should the speed of light, which is fixed by these basic laws.

This is all very well, so long as we forget that motion is relative. But a tricky problem arises, when we admit that each observer has a point of view to which the laws of physics should apply, impartially. As different observers move, in relation to each other, their movements give rise to differing perspectives.

In each of these perspectives, space is measured from a frame of reference that originates from a particular observer. Each frame of reference stays unmoved – in relation to its own, particular observer. Our measurements of space are thus relative. They are made from different frames of reference – which are carried differently, by differing observers. So space is not the same for each observer.

But when we investigate the speed of light, it turns out that this speed is the same for all observers. We are thus shown a more fundamental principle of nature's laws. The speed of light is fixed by some basic laws of nature, and so it is invariant. No matter how one observer may move in relation to another, light will move at the same speed, in relation to each of the two observers.

This conclusion goes against common sense. It means that speeds are not added up, in the way that we normally assume. When a plane is flying directly into the wind, the ground-speed of the plane must be added to the ground-speed of the wind, in order to calculate how fast the wind is moving in relation to the plane. But when a plane is flying directly towards a beam of light, the speed of the plane makes no difference to the speed of oncoming light. That speed is exactly the same for a flying passenger as for someone standing on the ground. No matter how fast a plane may fly, in whatever direction, light does not travel any faster or any slower, as observed by the passengers.

How can this be possible? Well, the mathematics shows quite clearly what is needed, so far as the calculations are concerned. We need to accept somehow that space becomes contracted and that time gets to pass more slowly, on the moving plane. Moreover, in connection with these changes in space and time, mass gets heavier.

But, how can we understand these calculated changes – of space that contracts, of time that flows more slowly, and of matter that gets heavier? According to the theory of relativity, these changes show that space, time and matter are not real in themselves. They are only relative observations, which get changed by the relative movements of objects and observers.

As an object moves faster, its kinetic energy increases; and so does its mass, which is the quantity of matter it contains. This shows a fundamental relationship, between matter and energy. Matter is a concentrated form of energy. Each can be converted to the other. An evidently large amount of energy can get taken in into the concentrated mass of a material object. Conversely, large amounts of energy can be released, through the conversion of an evidently smaller mass.

Thus, in the theory of relativity, there is a third approach, beyond the material objects of Newtonian structure and the transforming states of quantum systems. According to this third approach, what we call 'matter' is not real in itself. It is only a relative observation, which is related to other observations, like space or time or speed or momentum or energy.

As each observer sees the world, these observations are related together, in a perspective that depends on the observer. As different observers travel differently through space and time, their perspectives differ, and so do their observations of space, time, matter and energy. But then, what is it that we see in common, beneath the different observations that we make from differing perspectives? In the theory of relativity, this question is approached by looking for *invariant principles*, which are inherently the same for all observers.

When Einstein started developing the theory of relativity, he called it the 'theory of invariance'. It works essentially by looking for invariance. That is its basic approach. And, through this approach, it has proved very useful – in astrophysical descriptions of the universe at large, and in microcosmic descriptions of high energy physics at small scales of size.

Fields of force

When objects touch each other, it is easy to see how one object can press against the other and push it away. Or how an object like a hand can clasp another object and pull it back. Or how a rough or sticky object can rub against another and thus move it sideways. These forces act through direct material contact.

But there is another kind of force that seems to act at a distance. As for example when a magnet attracts a piece of iron; or when electrons are repelled by a negative electrode; or when a meteor falls to earth, drawn by the pull of gravity. This second kind of force is explained through the notion of a 'field'.

Here, a field is simply a conditioning of space and time. This is an ancient notion, which is called 'kṣhetra' in Sanskrit. The notion can be illustrated through an old analogy. A field of land is seen to be affected by geographic conditions of rock and soil formation and water flow and climate. Through this conditioning, a field of land exerts an influence on the various objects and plants and animals and people that are found in it. So also space and time may be described as affected by a conditioning that exerts an influence on both objects and living inhabitants.

In modern physics, of course, the question of living habitation is outside the range of study. Only objects are considered, in various fields that are mathematically described. The field description is achieved by attributing a quantitative value to each point of space and time.

This is how a field of force is described. At each location, the value of the field is used to specify a force, as for example an electro-magnetic or a gravitational force. The force is exerted on an object which is found at that particular location. But the force is not exerted by another object. Instead, it is exerted by the field conditioning, which is an inherent property of space and time.

For example, a piece of iron is not pulled by some distant magnet. Instead, it is impelled by the electro-magnetic field, at that same place and time where the piece of iron is located. So also, the earth and other planets are not pulled into their curving orbits, by a distant sun. Instead, each planet is impelled at its own location, by the gravitational field that is found exactly there.

This field consideration is a fourth approach – where force is not exerted by separated matter, but instead by a pervasive conditioning that extends through space and time. As modern physics has developed at the present time, fields of force are considered in two ways. One way is Newtonian and the other is quantum mechanical.

In the Newtonian consideration, the field extends through lines of force, which originate from material objects. As the lines extend from an object, they get dispersed in surrounding space. Proceeding outwards from the object, the lines of force get more dispersed. And so the field gets weaker, accordingly. It gets weaker in proportion to the square of distance from the object. This results in the inverse square law, which applies to electro-magnetics and also to gravity, in Newtonian physics.

In the quantum consideration, we can think that space and time are conditioned by the probable results of material measurement. In this way of thinking, each point of

space and time is conditioned by the probability of finding a certain kind of particle there, with a particular energy and momentum. Each kind of particle is thus associated with its own quantum field. For example, electrons are associated with an electron field, where each location is conditioned by the probability of finding an electron. Similarly, protons are associated with a proton field, neutrons with a neutron field, and so on.

But what about a quantum of light energy? According to the theory of relativity, it has a small mass, and so it is somewhat like a particle. A quantum of light is thus called a 'photon'; and it gets to be described in a more sophisticated theory of electromagnetics. The new theory is called quantum electro-dynamics. It quantizes a particle's equation of motion, as described in a restricted version of the theory of relativity.[3]

As shown by quantum electro-dynamics, our measurements of energy are not continuous, in an electro-magnetic field. As we observe the field, our observations of its energy must rise or fall in quantum steps, through a discontinuous series of levels that our instruments detect. Thus, a photon is an indivisible quantum through which the energy of an electro-magnetic field may change, as we observe its increase or its decrease, from one level to the next one up or down.

In this respect, a photon is quite different from a material particle. It is not a separate piece of matter, contained within a small locality. Instead, it is a quantum step, between successive levels of observed activity, in the whole electro-magnetic field. By thinking thus of the entire field, it turns out that photons are not really particles.

It isn't fully accurate to think that a quantum field is made up of uncertain particles. What seems to be a particle is more accurately described as a quantum step, between successive levels of observed activity. Each photon is a quantum step in the electro-magnetic field. Each electron is a quantum step in the electron field; each proton or neutron is a quantum step in the proton or neutron field; and so on.

In quantum field theory, there's no such thing as empty space. All space is filled, inherently, with a continual activity of quantum fields. In every locality of space and time, there are huge fluctuations of momentum and energy. The fluctuations are unlimitedly large, but they are also very closely spaced and very rapid. They come and go so close together and so quickly that our instruments cannot detect them.

Wherever space appears to be empty, its fluctuations cancel each other out, at the scales of size which we observe effectively. As we observe the world through our material instruments, each quantum field keeps working in a way that cannot be observed directly. It works through the overall effect of a great many fluctuations – which keep on taking place, unobserved, beyond the range of our material instruments.

But then, a question arises. If we can't observe these fluctuations, how else can we understand them? One rough and ready way is to think of them as 'virtual particles'. They are a little bit like particles, because they carry momentum and energy, like bullets fired from a gun.

For example, we can think that an electron is surrounded by a swarm of virtual photons, which it keeps on emitting and absorbing. When two electrons are near each other, they keep on throwing virtual photons straight at each other, and this continued throwing has the recoiling effect of repelling each electron away from the other.

Or, when an electron and a proton are near each other, they keep on throwing virtual photons in a boomeranging motion – from the back of the electron to the back of

the proton, and the other way around. Because the virtual photons are thrown boomeranging round, the electron and proton recoil towards each other, as each is driven from behind towards the other.

But, when we speak like this, the word 'virtual' is meant to be a warning. Virtual particles are not actually particles at all. If we think of them as particles, we have to imagine that they are first created from nothing, and then destroyed back into nothing. As they are created and destroyed, very rapidly, so is their momentum and energy. Accordingly, they violate the laws of momentum and energy conservation, which must be obeyed by each particle that is materially observed.

These conservation laws are essential to modern physics, as it derives its mathematical descriptions of all objects and activities that are observed through its material instruments. All particles that are observed must obey these basic laws. And yet we are now imagining that there are '*virtual* particles', which are somehow different. They somehow manage to defy the same, essential laws that other objects must obey.

In fact, a virtual particle is very different from a particle that is observed materially. As we have seen, even when we speak of 'observable particles' in quantum physics, the meaning of the word 'particle' is rather stretched, beyond its normal and familiar use. So then, when we go on to speak of '*virtual* particles', our use of language gets more wild. We were already speaking in a way that was crude and tricky; but now our description has become much cruder and much trickier. As this description is made, it raises more questions than answers. It is essentially provisional, as we try to progress from our habitual ideas of separated matter, towards a more subtle way of thinking about pervasive fields.

In a manner that is similar to quantum electro-dynamics, other fields of force have been described, to account for the behaviour of matter and energy at sub-atomic and sub-nuclear scales of size. In particular, there are two fields that are called 'weak' and 'strong'. The 'weak' force accounts for radioactivity, through the disintegration of neutrons and many other particles. The 'strong' force accounts for the formation of a great variety of particles, through the binding together of more fundamental particles called 'quarks'.

In these theories of quantum fields, it is conceived that material particles are more accurately described as gross appearances produced by more subtle fluctuations in the conditioning of space and time. Although a structured world seems made of smaller and smaller parts, these structural descriptions are found eventually to fail, as we consider smaller and smaller scales of size.

We can, at first, make finer observations of small things by constructing material instruments, like microscopes. Such instruments serve as extensions of our senses, enabling us to perceive smaller parts and smaller details in the construction of objects that are perceived by our unaided senses.

But, as we thus mechanically extend our senses, we have to construct increasingly complex instruments, which get accordingly more specialized. In turn, the specialization keeps on requiring an increased co-ordination of more and more special results that need to be interpreted.

It is here that a conceptual advance gets to be made, by the theory of quantum fields. The units of description here are not material objects or particles – which are *shown separated* by intervening distances in differentiated space. Instead, the units of description are field fluctuations – which *keep continuing* throughout all different parts of space and all changing periods of time.

Even where space seems empty, it is conceived to be always filled with these closely bunched and hugely violent field fluctuations, whose overall effect is an extremely subtle and pervasive connection between all different places and all changing times. As will be described in the next talk – on *Nature and consciousness* – this modern physical conception has a striking counterpart in the ancient Indian idea of an 'aṇu' as a tiny unit of subtly vibrating energy (see page 36).

The space-time continuum

But what about the force of gravity – which seems to act between all objects, across the vast spaces of the universe? This is a long-range force, which predominates at large scales of size. In the atom, electro-magnetic forces are much stronger than gravity, because of the electric charge in the electrons and the nucleus. But, at larger scales, objects tend to be neutral, in their electrical and magnetic charge. The positive and negative charges are usually balanced, and their overall effect is neutralized. Accordingly, when we describe the solar system or the galaxy or inter-galactic space, it's gravity that gets to be the main consideration.

In modern physics, the universe at large is described through the theory of relativity. Here, there is a fifth approach, which works essentially through geometry.[4]

In Newtonian physics and in quantum physics, a world of objects is described. These objects interact through force, in changing systems of activity. So the description is essentially mechanical. The units of description are objects that interact mechanically, like the component parts of an extremely complex and sophisticated machine.

But in the theory of relativity, the basic units of description are not objects. Instead, they are events. And these events are related geometrically. They are described as geometric points, which are connected to each other by pure geometry. The geometry defines a four-dimensional continuum. It includes our usual three dimensions of extended space, together with a fourth dimension of passing time.

In this continuum of space and time, all movement is entirely unforced. Each line of travel is always the most natural. It is always a straight line; because it always takes the shortest path in a four-dimensional geometry, which joins together the differing events of space and time.

However, the geometry can be complicated, rather like the bumpy surface of our planet earth, with its mountains and valleys. The earth's surface is of course only two-dimensional, with one dimension for latitude and the other for longitude. But where this two-dimensional surface is bumpy, as in a mountainous region, the shortest and straightest path often seems to twist and turn, in a forced and unnatural way; when it is seen from a one-dimensional perspective that looks at the path point by point, as one travels along it.

Something similar happens in the four-dimensional geometry of the space-time continuum. In our usual perspective, through our immediate senses, we see a world of three dimensions in space, changing from moment to moment. As the bumpy geometry of space-time is seen from this three-dimensional perspective, the four-dimensional bumpiness produces the appearance of separate material objects and the forced motions that they seem to inflict upon each other.

In our everyday perspective, we are material observers, travelling through a world of objects that are located in the three dimensions of space, at each point of time. The theory of relativity describes a more fundamental perspective, in which all space and

time are taken together, as an underlying continuum that subtly interconnects all different-seeming things.

The space-time continuum is thus a single substance that is utterly immaterial. It is a substance that consists of nothing else but space and time, which are described on the basis of pure geometry. Here, space and time are not conceived as a container, in which objects and events are placed. Instead, the space time continuum is an underlying background that is present everywhere, continuing through all the events that manifest it to our varied observations. All seemingly material happenings are only differing and changing appearances – which show one single continuity, pervading through all space and time.

This conception is of course quite similar to the old idea of 'ether' or 'ākāsha'. However, it must be admitted that the theory of relativity has only had a mixed success, in its attempts to explain the forces of nature. Its description of gravity has met with a partial success, in our macroscopic views of the universe at large. But, despite considerable efforts, there has been no successful explanation as to how electromagnetism might be reduced to space-time geometry. Nor have the 'weak' and the 'strong' forces been explained in this way.

As things stand at present, there is an unresolved opposition, between the differing approaches of quantum mechanics and the theory of relativity.

- In quantum mechanics, there is a basic emphasis upon discontinuity and uncertainty. Here, it is claimed that nature forces us to observe things with a minimum jerkiness and fuzziness that we can never go beyond.
- In the theory of relativity, the emphasis is basically on continuity and certainty. The space-time continuum is inherently continuous and fully determined. All time is contained in it; so there is no question of its getting changed, as time passes by. In particular, as we measure the continuum, it cannot in itself respond with discontinuous and uncertain results. Wherever we perceive any jerkiness or fuzziness, these qualities cannot belong to the continuum itself. They must false appearances, which have been superimposed by imperfect observation.

  As we observe the world in a jerky and a fuzzy way, the problem is that our instruments are crude and artificial. Our problem here is technological. It is the instruments we use that make our observations faulty. So it is wrong to lay the blame on some final law of nature, which somehow forces limits on our knowing. As Einstein put it: 'Nature hides her secret by her essential loftiness, not by a cunning strategy.'[5]

In short, the opposition is just this. According to quantum physics, our faulty measurements can't be improved beyond a final limit that is fixed irrevocably, by nature itself. But in the theory of relativity, the problem is located in our technologies – which are inherently provisional and never final, because they are always liable to improved by further discoveries.

Despite this opposition, between two differing approaches, modern physics uses both of them. Quantum mechanics is used mainly for microscopic descriptions, at small scales of size. The theory of relativity is used mainly for macroscopic descriptions, of the universe at large. The jury is still out on how these differing approaches may be resolved.

And the jury is still out on a further question, of how modern physics may relate to our experiences of life and mind. That question basically involves the older sciences,

which have long developed their own ways of investigating nature. These older ways will be discussed in the next talk.

Nature and consciousness

Doing and knowing

In modern physics, nature is conceived as an external world, which is made up from objects and the structures that they form. But this results in a restricted view of nature. As modern physics views the world, it leaves out our experiences of mind. Its descriptions are restricted to a world of structured objects; and it leaves unexamined the succession of appearances that come and go in our minds. These are the appearances which we perceive and think and feel. They are produced by living acts of perception, thought and feeling, in our senses and our minds.

But, as the word 'nature' comes down to us, it speaks of an older and a deeper conception, which includes our experiences of life and mind. The English word 'nature' comes from the Latin 'nātus', meaning 'born' or 'produced'. This derivation shows a sense of living creativity, which is associated with the concept of nature. On the one hand, the concept refers to underlying nature, from which arise the changing phenomena that are perceived in the created world. And, on the other hand, the concept also implies the creative activities of nature, through which perceived phenomena arise.

Our present word 'physics' comes from a much older word 'phusis', which meant 'nature' in ancient Greek. But that 'nature' was not just what we call 'physical' today. As the word 'phusis' was used by the ancient Greeks, it implies a growth of life, with an expression forth of meaningful activity. That includes our passing states of perception, thought and feeling – which we experience in our lives and minds, in the course of mental time.[6]

Essentially the same meaning is carried by the Sanskrit word 'prakṛiti', which also means 'nature'. Literally, 'prakṛiti' means 'acting forth'; and it is thus used to describe the entire realm of all activities, most definitely including the activities of mind through which we express and interpret meaning in the world outside.

In these old concepts – of the Latin 'nātūra' or the Greek 'phusis' or the Sanskrit 'prakṛiti' – nature is not just an external world, somehow observed outside our perceiving personalities. Instead, it is a complete realm of all physical and mental activity, which produces all the appearances that come and go in everyone's experience.

When our minds conceive of an external world, it is an artificial construction, conceived by minds that it excludes. This world does not show itself to us. Instead, it needs the addition of our senses and our minds, in order to show up in our experience. By contrast, the old idea of 'nature' points to a complete functioning. It includes not just the world, but also the faculties of sense and mind that produce all the appearances in everyone's experience.

So, in this broader conception, nature shows itself; because it contains all the activities that make it function. It manifests itself, spontaneously, always of its own accord, motivated from within. That spontaneity is what makes nature natural. It is not interfered with or driven artificially, from the outside, by any instrument that is left out of its consideration.

When nature is conceived like this, all our perceptions, thoughts and feelings have been taken into it. Here, they belong to nature's functioning, which produces all the appearances that we perceive and think and feel. In this broader approach to nature, all of our perceiving and our thinking and our feeling must be understood as known

activities, along with the external world. All personal activities of sense and mind must now be understood objectively. They must be understood as part of what is known, along with all objects in the outside world.

But how is that possible? How can we understand our minds objectively, as part of nature's functioning? Viewed from a person's mind, consciousness appears to be a stream of perceptions, thoughts and feelings, which come and go in mental experience. This is a stream of mental activity, which we often call the 'stream of consciousness'. This stream is changing and personal. It changes from moment to moment; and it is different from person to person.

The problem here is that we habitually identify our knowing with this changing stream of personal activity. We think that this changing stream is consciousness itself. We think of it as that which knows – as the consciousness that knows our experiences. And so we don't usually ask any further, how this changing stream is known.

That further asking is essential to the old idea of nature. Where nature is conceived to include our minds, there must be a questioning of how those minds are known. Accordingly, it is essential to ask for a consciousness that knows our changing states of mind, as they replace each other in the course of mental time.

For example, suppose that I come out of a warm house on a cold day. Then, previous feelings of relaxing warmth give way to rather different feelings of invigorating or numbing cold. How do I know this change, which appears through my senses and my mind?

As cozy warmth gives way to chilling cold, the change takes place through changing acts of perceiving and thinking and feeling. Before I leave the house, there is a consciousness of warmth. After I leave the house, there is a consciousness of cold. The warmth and the cold are different, and so are the activities of feeling them and thinking about them and perceiving them.

But, if I ask about the consciousness that knows the warmth and the cold, then there is something more involved than mere difference. As warmth and cold are known, they are contrasted and compared with each other. And this implies a knowing that continues underneath, as differing appearances replace each other in our minds.

As I leave the house, warmth is replaced by cold, at the surface of my mind. There is accordingly a turning of attention, from one appearance to another. But, underneath this change, there is a knowing that continues, at the background of experience. That knowing is quiet and undistracting. It is not a noisy and distracting appearance of physical or mental activity, which takes attention away from other such appearances. Instead, it is a silent witnessing – whose knowing carries on in the background, beneath the changing and differing appearances of mind.

Wherever any change is known, that background knowing is implied. It is a knowing basis that continues quietly, beneath all changes that appear. It is that basis of consciousness which enables us to contrast and to compare the appearances that we perceive.

It's only thus that differing perceptions of warmth and cold may be compared and co-ordinated, into a coherent knowledge of temperature. Without such an underlying basis of consciousness, we could not learn from experience. Our differing perceptions, thoughts and feelings could not be assimilated and put together, in coherent knowledge.

Moreover, each time we form any conception of other people, with minds other than our own, we can only do so by assuming a basis of consciousness which we share in common with them. That is the basis on which we form whatever conception we may have of other people's feelings, thoughts and perceptions. Without that basis, there could be no communication between people, no knowledge of other minds, and hence no notion of other people at all.

In short, the changing activities and appearances of mind can only be known on the basis of an underlying consciousness which is unchanging and impersonal. It is a basis of subjective knowing that is shared in common, beneath all changing states of time and all differences of personality.

Thus, with all physical and mental faculties included in objective nature, what's left is a pure consciousness entirely detached from personal activities. That consciousness is in the end impersonal and actionless. It has in it no trace of physical or mental personality; nor is it mixed with any physical or mental actions. All actions, carried out by any instrument, belong to objective nature, which gets illuminated by the knowing light of consciousness.

That light is not an act which consciousness puts on. Instead, to shine with knowing light is the very being of subjective consciousness. By its mere presence, always unengaged in any changing act, it illuminates all the appearances that nature shows, in everyone's experience.

In this old conception of nature and consciousness, the objective part of experience is described as the *doing* of nature. And the subjective part is described as the *knowing* of consciousness. This is a division of experience into doing and knowing.

- *Doing* is the action of an instrument, which is itself an object of some other such action. Such actions occur in the realm of a completely objective nature – which produces all phenomena, both physical and mental, throughout all space and time. Whatever may appear is here conceived to be produced by the same objective nature. One universal nature is thus taken to manifest itself, in all the phenomena that may appear – no matter where or when, no matter how perceived or thought or felt, in anyone's experience.
- *Knowing* is the actionless illumination of a purely subjective consciousness, which is not an instrument or an object of any action. That consciousness is self-illuminating in itself, in its own being. By its mere presence, as it is, in everyone's experience, it lights each one of the appearances that come and go. Its actionless illumination is thus conceived to light the show of changing happenings that nature manifests, no matter where or when perceived.

In this conception, knowing is inherently impersonal, at the inmost centre of personal experience. That centre is at once subjective and impersonal. But it is surrounded by mental and physical activities of personality, which obscure its impersonal and actionless illumination. It thus appears confused with personal activities, and it seems compromised by their partialities. This is our outward view of it, seen through our personalities.

In Sanskrit, the central essence of a person is called 'puruṣha'. It is described in the Bṛihadāraṇyaka Upaniṣhad (2.5.18).[7]

sa vā ayaṁ puruṣa	That which lives within all bodies
sarvāsu pūrṣu	is in truth, this puruṣha.
puriśayaḥ…	For, in the body, it abides at rest.

Thus, puruṣha is that which lives in personality, at the centre of a person's physical and mental activities. It lives there quite unmoved and undisturbed, as an unmixed consciousness whose knowing is quite unattached to anything that's known. There is in it no mixture with our physical and mental personalities, whose actions it illuminates. Accordingly, it is an impersonal core of subjective knowing, found at the centre of our lives, as our minds and bodies carry out their actions in the world.

This conception opens up the use of subjective investigation, in scientific disciplines that seek to know things more impartially. By reflecting inward, a subjective questioning can get progressively detached from partialities of personal perspective; thus seeing things more deeply and more clearly, from a stand that has gone deeper back towards the inner core of personality. Here, knowledge is refined and deepened by a process of inward detachment, progressing towards a subjective centre where our knowing is essentially impersonal. Thus, by going deeper back into our lives and minds, we tap resources that enable us to see and do things better.

Living energy

However, an inward search for knowledge does of course present us with a tricky question. Having gone back in, how does one come out again? How does an inner knowing get applied, in the world that we perceive outside?

This question is answered by the idea of 'life'. Very simply, life is how consciousness becomes expressed, through nature's functioning. We experience that expression in our living bodies, particularly when we speak. Then, as we speak, breath flows and vibrates, so as to produce the meaningful appearances of spoken sound. Thus, through a vibrating flow, of breath that rises from within, consciousness becomes expressed in speech.

In many old conceptions, the flow of breath producing speech is used as a metaphor, for the expression of consciousness in nature. In Sanskrit, the energy of that expression is called 'prāṇa', which means both 'breath' and 'energy'. The energy of prāṇa is conceived as flowing and vibrating in a subtle way, like breath, so as to show us meaningful expressions of consciousness, appearing in the outside world.

In this idea of 'prāṇa', energy is treated as essentially alive. But its life is not just personal. The consciousness expressed by it is not a personal activity, confined to the personalities of any living creatures. Instead, that consciousness is actually found present everywhere. For it illuminates each one of the appearances that nature manifests, in all experience of the manifested world. As actually experienced, by anyone, wherever nature manifests, consciousness is present there, illuminating what appears. It thus extends throughout all nature's manifesting of the world.

This provides a comprehensive description of experience, as a process with two aspects complementing one another. Nature is the manifesting aspect, producing all appearances through physical and mental action in the world. Consciousness is the illuminating aspect, lighting each appearance by its presence through them all. And prāṇa is the energy that drives the whole process of manifestation, by expressing consciousness in the appearances that nature manifests.

In the minds and bodies of living creatures, consciousness is personally expressed, by the personal activities of our limited and partial faculties. But, in nature as a whole, the expression is impersonal, through universal principles of nature's ordered and intelligible functioning. Thus, nature has a universal life, expressed through natural principles of purpose, meaning and value that we understand reflectively. We understand them by reflecting back into our own experience, where they are found as well.

In that reflective understanding, we go beneath all physical and mental faculties, to an inmost depth of experience where no personality remains. It is from there that the living energy of prāṇa rises, expressing consciousness in all of nature's functioning, both in our personalities and in the outside world.

Thus prāṇa is an energy that acts from underlying consciousness. It does not act from any object or from any faculty of personality. All faculties and objects are its instruments, which it produces as it rises from beneath them, expressing consciousness through their activities in nature's functioning.

In the external world, prāṇa is conceived to behave in a way that has some similarity with the energy of modern physics. Here, material objects are conceived as concentrated or coagulated patterns of dynamic energy. Through our crude, unaided senses, we see these patterns as gross objects, with boundaries separating them in space and time. But, beneath their gross appearance of bounded separation, they are essentially interconnected, by subtle vibrations and radiations of fluctuating energy. All objects are conceived to be made up of subtle particles, described by the Sanskrit word 'aṇu'. Somewhat like quantum particles, aṇus are not just small pieces of gross matter. Instead, they are tiny units of dynamic energy, organized in interconnected patterns of vibrating and radiating fluctuation. As it is said in the Kaṭha Upaniṣhad (6.2):

yad idaṁ kiñ ca	This universe of changing things –
jagat sarvaṁ	whatever may be issued forth –
prāṇa ejati	it all consists in living energy,
niḥsṛtaṁ…	which moves and oscillates and shines.

But, beneath the similarity with modern physics, there is of course a crucial difference. The energy of prāṇa is alive. Both in our bodies and the world outside, it is a natural energy whose functioning expresses living purpose and meaning, from underlying consciousness. This living energy cannot be accurately known by looking out at its external forms and thereby controlling them, through our material bodies and their external instruments. To know it properly, this energy must be approached reflectively, through a reflective listening that harmonizes our living faculties with what they see outside themselves.

From the viewpoint of prāṇa (and other such notions in different traditions), the energy of modern physics is rather crudely objective. For, in modern physics, energy is measured through material instruments and described by mathematical calculations. Thus measured and described, it is controlled – again through material instruments – towards the achievement of external objectives. The trouble here is that a subtle energy is being measured and controlled by material instruments which are essentially much cruder and more gross.

As quantum physics admits very explicitly, such crude material instruments interfere indelicately with what we know through them. So they can only give us an uncer-

tain and discontinuous knowledge of the world. Thus, on the one hand, quantum systems are mathematically described as evolving in a perfectly definite and continuous way, when we do not measure them or interact with them through our instruments. But, on the other hand, this mathematically ordered certainty and continuity cannot be known properly through our crudely interfering and disturbing instruments, which can only measure and control things doubtfully and jerkily.

In the idea of 'prāṇa', as 'living energy', the same problem of accuracy is differently approached. When energy is thus conceived, as essentially alive, its observation and control is essentially reflective, quite unlike the external observations and controls attempted through the material instruments of modern physics.

In order to observe the living energy of prāṇa, looking through material instruments is insufficient. There has to be a reflection back into the life of one's own personality. It's only by returning back into one's own living faculties that prāṇa can be seen and controlled, expressing consciousness in personality and world.

For prāṇa is an energy of inspiration, essentially including purposes and meanings and values that we perceive in objects and events and persons. It's only through some inwardly inspired sense of purpose or meaning or value that consciousness is seen expressed in objective happenings. The energy of prāṇa is an inner inspiration that arises from underlying consciousness, found always present underneath each object and event, in everyone's experience. From there, each object and each happening spontaneously expresses consciousness, through the purpose and the meaning and the value that we see in it, as part of nature's functioning.

In this conception, nature's actions are all animated from within, by the inner inspiration of prāṇa's living energy. Nature does not function like a partial person, driven by limited and changeable desires for some partial objects of external perception. Instead, the functioning of nature is inspired only for the sake of expressing an inner consciousness – which in itself remains unmoved and unaffected, through all of nature's changing acts.

In Sanskrit, this functioning of nature is described by the phrase 'puruṣhārtha'. The meaning is, quite simply, that nature functions 'for the sake of consciousness'. In the *Sānkhya-kārikā*, this natural functioning is exemplified by the flow of milk in a mother's breast. Such a functioning is not dictated or contrived, in order to achieve some outward object seen by sense or deliberated in the mind. Instead, as in the flow of mother's milk, the functioning of nature is inspired from an inner principle of life that is expressed in all physical and mental actions.

Seen outwardly expressed through mind and body, that inner principle is unaffected consciousness. It is the inmost subject, whose knowing is completely pure, remaining always utterly unmixed with any changing act. That is the inner principle of nature's life, no matter when or where expressed. All nature's happenings are done for its sake.

Here is how the *Sānkhya-kārikā* puts it, in stanzas 52 and 60.

vatsa-vivṛddhi-nimittaṁ	As milk unknowingly performs	
kṣīrasya yathā	a function nourishing the growth	
pravṛttir ajñasya	of a young child; so also	
puruṣa-vimokṣa-nimmittaṁ	primal nature serves the unmixed	
tathā pravṛttiḥ pradhānasya	freedom of the knowing principle.	*52*

nānā-vidhair
upāyair upakāriṇy
anupakāriṇaḥ puṁsaḥ,
guṇavaty aguṇasya
satas tasyā 'rtham
apārthakañ carati.

All qualities belong to nature,
as she acts in many ways;
not for the sake of objects gained,
but serving only for the sake
of that true inner principle
which has no qualities itself
and is not moved by any act. *60*

From ancient Greece, Aristotle tells us of a similar conception, where 'phusis' or 'nature' is considered to be moved from within. All nature's movements are self-motivated, acting of their own accord.[8] They take place spontaneously, for love of an unmoved principle[9] whose inner knowing lights itself and activates all nature's life. That inner principle is called the 'unmoved mover'.[10] It is the unmoved ground of knowing, present everywhere, beneath all experiences of personality and world. At that unmoved ground, there is no movement or activity; but all movement and activity arises up from there. And it arises naturally, not driven by any mental or physical instrument, but motivated by an inner inspiration that spontaneously expresses consciousness in everyone's experience.

That inner inspiration is the living energy of prāṇa. As it arises from the impersonal ground of consciousness, it functions naturally through the living purpose, meaning and value that we find expressed in nature's ordered and intelligible functioning.

Nature's life

But what does it mean when we speak in this way, about a living energy that motivates all nature's functioning? We are then speaking of all nature as alive. Here, nature functions with an energy that is both living and impersonal. As nature works, it does not function partially, in order to achieve the limited objectives of some partial personality. Instead, as nature works, its functioning takes place through an impartial order, whose purposes and meanings and values are in essence quite impersonal.

The trouble is that we habitually conceive of life as a personal possession, which belongs to our bodies and our minds. But this conception does not apply to the living energy called 'prāṇa'. It is not just a subordinate possession that belongs to any object. Nor does it belong to any person. It is not an energy that gets to be transacted between objects and persons, as they interact with each other in the world. Instead, it is an energy that rises up from its subjective source, in underlying consciousness. And there it keeps returning to renew itself; so that it may rise again, refreshed.

Accordingly, the living energy of prāṇa cannot be reduced to the mutual interaction of perceived objects and persons in the world. This living energy can only be observed through a subjective reflection back, into a common ground of consciousness. To see an act as living, there must be a sense of kinship with it – a sense that it expresses some common principle of life, in which one shares oneself.

That sense of living kinship is most obvious with like-minded people who share similar attitudes and ideas. It is less obvious with those whose ideas and habits are unfamiliar; but there is still some sense of kinship that enables us to recognize them as human, like us. There is even some rudimentary sense of kinship with living creatures of all kinds; though the more primitive they are, the more rudimentary is the sense of kinship that enables us to recognize them as alive.

Eventually, there are objects – like a table or a rock – that are not recognized to be alive at all. They do not have anything that even remotely resembles our sense faculties, and their behaviour does not show even the most rudimentary kind of purpose or intention that we experience in our minds.

So it seems that life is a special property belonging to living creatures, with faculties of sense and mind that look at least a little bit like ours. Outside the bodies of living creatures, there seems to be no reasonable basis for seeing nature as alive. Beyond the fanciful imaginings of myth and fiction, we fail to see a living kinship with most objects, like a table or a rock.

We thus take consciousness to be an exclusive privilege, which belongs primarily to our minds and bodies; though we concede that it is also expressed, most often to a lesser extent, in some few bodies and minds that look to us like ours. Our view of life and consciousness is rather narrowly dependent upon our particular faculties, and so we can only see a very small and special part of nature as alive. We find no rational basis for seeing otherwise.

However, in old spiritual traditions, all nature is conceived to be alive. And the conception is not just a matter of religious faith or mystical intuition. It is also reasoned, very carefully, through a skeptical enquiry into the nature of experience. Here, the conclusion reached is that anything in the world may be perceived as alive. Or it may not. Whether something is alive or not depends on how one looks.

For example, take a person's body. When it is seen to be made up of physical parts, interacting with each other and the world outside, then it is 'jaḍa' or 'lifeless matter'. But when these interactions are seen to express an inner consciousness, then the body is taken to be alive, animated by the subtle energy of living faculties.

The same analysis applies to a person's mind. When it is seen as an objective process, with previous states producing later states, then it too is jaḍa or lifeless. Mental states may be more subtle than physical objects; but they too are lifeless matter, if we consider only the relationships between them. However, if they are seen to express a consciousness from which they rise, then the mind is taken to be alive. It is then a 'jīva' or a 'living psyche' – which experiences what happens, as it goes on living in the world.

A similar analysis applies to an object that seems merely physical, like a rock. As something made of interacting parts, or as itself an interacting part of world, it is lifeless matter. But if we see some further meaning in its interactions and relationships, then the rock says something to us; and we listen to what it has to say, thus treating it as an expression of life.

If a rock has been sculpted into some implement or work of art, then it obviously expresses the living consciousness of those who sculpted it. But what about a natural rock – where no person has interfered, to impose an artificial meaning from outside? Here also, there are two ways of looking at the rock. One can picture it and describe it, as an arrangement of objective features; or one can look at it more deeply, in a way that awakens one's intuitions.

As one looks more deeply, mere pictures and descriptions are left behind. Alternately pushed and pulled, by feelings of puzzlement and beauty, one is led to find correspondences and symmetries – which show an underlying kinship and harmony, between the rock and other things.

Thus, the rock is seen to express an inner meaning, as a manifestation of nature. And this inner meaning is understood by reflecting back into the depths of one's own

experience, thereby implying a profound kinship between the rock and oneself. Here, the rock is understood on the basis of its kinship with oneself, and so is all of nature. But that reflective kinship is exactly what characterizes our understanding of living beings. In this sense, both rock and nature are now treated as alive.

What could be one's kinship with all of nature? In old spiritual traditions, that kinship is conceived as a common ground of consciousness, found everywhere expressed. In each particular creature, that consciousness is seen expressed through a particular mind and a particular body, with limited faculties of mental and physical action.

In the world as a whole, that same consciousness is found expressed through nature's underlying order, with all the meaning and the intelligibility that enables our conceptions of the world. As consciousness continues through all experience, so also nature's order extends throughout the world.[11]

See-er, seeing and seen

Unfortunately, there tends to be a problem in the way that we view our old spiritual traditions. We tend to assume that they only proceed through an unquestioning belief in the mystical authority of revealed religion. And so we tend to ignore a profoundly reasoned enquiry through which they question our habitual beliefs about ourselves and the world.

In particular, we usually take it for granted that each one of us is a knowing person, in a known world. This habitual assumption is shown in the top row of figure 5. But if we examine what is meant by a 'knowing person', it turns out that our usual assumption is not nearly so simple as it seems.

A knowing person has a body that belongs to the known world. The body has senses, which perceive the world. As the world is perceived, these senses somehow bring information from the world. And that information then appears, in the mind of a person who perceives it.

Accordingly, part of the knowing person also belongs to the world that is known. It's clear that a person's body is included in the world. But is isn't so clear that the senses belong completely to the world that they perceive. And it is even less clear how far the mind is included in the world that it perceives and thinks about and feels.

The trouble is that the senses and the mind can often imagine things that do not actually exist, in the world that they perceive and think about and feel. The thoughts and feelings in our minds can often dream of things that the senses have not actually perceived. And even the senses do not show us what is actually in the world. They only

Figure 5

Unexamined assumption	Knowing person		Known world
Distinction of see-er and seeing	See-er	Seeing	Seen
Seeing included with the seen	Pure consciousness	Self-manifesting nature	

show us sights and sounds and odours and flavours and sensations that have to be interpreted by our minds, in order to know what has actually been perceived.

It thus turns out that it isn't very clear what we mean, when we describe ourselves as knowing persons. As each person knows the world, there is a process of perceiving that takes place, through activities of body, sense and mind. It's through these activities that each perceiver gets to know what is perceived.

So, in what was loosely called a 'knowing person', it is more accurate to make a distinction between a continuing perceiver and a changing process of perceiving. The perceiver is a knowing subject, who carries out activities of physical and sensual and mental perceiving. Through this distinction, we come to a three-fold analysis, which is shown in the middle row of figure 5. First, there is a *see-er*. Second, there is an activity of *seeing*. And third, there is a world of objects that are to be *seen*.

But if we look again at this three-fold analysis, it turns out that the seeing does not rightly belong with the see-er. In order to know things properly, the process of seeing needs to be examined, so as to correct its mistakes and to make it more accurate. And, to examine the seeing, it must be included in what is seen.

So the seen and the seeing must be taken together, as a complete realm of all physical and mental activity. As shown in the bottom row of figure 5, that realm is conceived as a self-manifesting nature. It shows itself to a pure consciousness that stays entirely unmixed with any changing activity.[12]

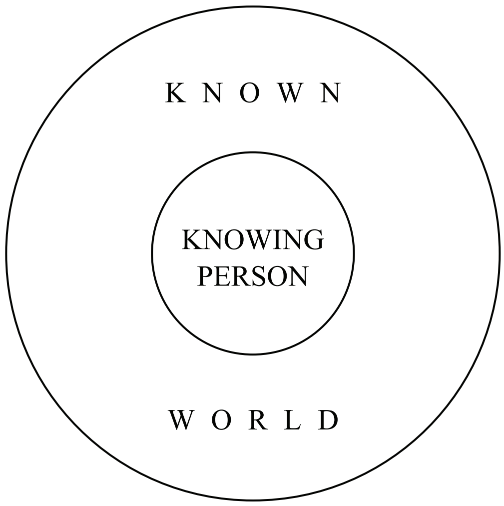
Mediating mind

Picturing an outside world

As nature shows a world to us, the world is pictured by our senses and our minds. Here, in the pictured world, each person gets a curious view of her or his own experience. For each of us, it appears that one's own experience is divided into two parts.

- One part is a knowing person, with a body in the world. The body has senses, which bring perceptions from the world into the mind. Through thoughts and feelings in the mind, perceptions are interpreted and put together, so as to know a world outside.
- The second part is a known world, which seems to surround each person that knows it.

Figure 6



These two parts of experience are illustrated in figure 6. When experience is divided in this way, we identify our knowing as a personal activity of sense and mind. We take it for granted that our knowing is made up of perceptions, thoughts and feelings, which somehow take place in a person's body. Each person thus experiences herself or himself as a sort of knowing island, surrounded by a known world.

But there is something very wrong with this view, that knowing is no more than a personal activity. Here, far too much importance has been given to a limited and partial personality – which is identified as a knowing subject, at the centre of experience. When that centre is thus viewed as essentially personal, there seems to be no basis on which knowing can be more detached, so that things may be known more impartially.

On further questioning, it turns out that our physical and mental persons are not knowing in themselves. Our bodies, our senses and our minds do not actually know anything. They only act as instruments, which produce our pictures of the world. Through the movements of our bodies, the senses that they carry are directed towards objects. The senses thus record sensations, which are transmitted to our minds. And our minds use those sensations to draw pictures and to tell us stories, which describe what happens in the world.

If we now ask how our minds draw pictures, and how they tell us stories, we get a rather different view of how we know the world. Our minds are always partial. They never show us everything at once. At any given time, the mind shows only part of some picture that it draws or some story that it tells. What appears is only a particular piece of perception, thought or feeling. It is never the whole picture or the whole story.

As time goes by, each mind displays different pieces of perception and conception. These pieces are objects and events, in the picturing and story-telling that goes on in

mind. It's only in the course of time that the world appears. It appears one object at a time, as the mind's attention turns from one object to another.

As each object comes and goes, it takes part in the process of experience in our minds. It's through this process that we form our pictures, and tell our stories of a physical and mental world. In order to investigate the truth of our pictures and our stories, it can help to examine how they appear and how they are interpreted, in the course of passing time.

Focusing attention

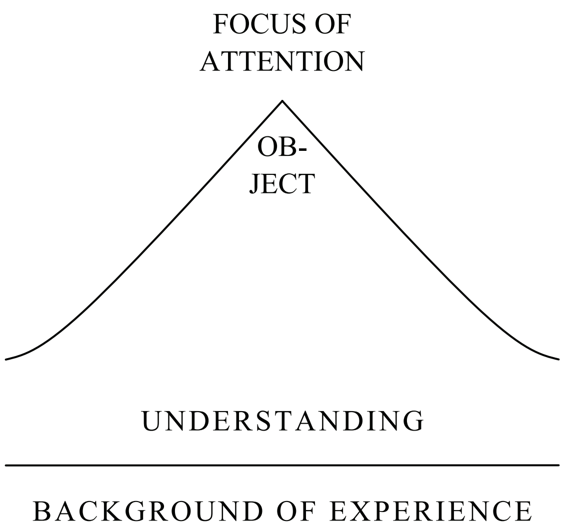
An object appears when attention has turned to it. At this moment, it now occupies a narrow focus of attention, where other objects previously appeared. But, in this focus of attention, a great deal more is understood than what appears on the surface. As attention is focused on an object, the focusing must draw upon a broader base of understanding, which includes everything that is known about the object. From that broader base, it's understood where the object is, how it relates to other objects, and how it is part of a larger world.

Thus, beneath the front tip of attention, there is a broader base of understanding, which takes into account a larger world. That base is understood at the background of experience, from where knowing is drawn up into narrower perceptions at the surface of the mind.

To make things more concrete, let me give you an everyday example. Suppose that I am driving a car, and I notice that the engine is sounding a little odd. At this moment, sound appears, at the tip of my attention. But, in the attention that I give to the sound, many things are understood. I hear the sound; but in that hearing I understand how the car was sounding before, what other things have been happening to the car, who else drives the car, who needs it and for what, the sort of car it is, how it can be repaired, my previous experiences with cars and machines and mechanics, and so on. All these and other things are drawn upon, from the background of experience.

This gives us a snapshot view of experience in our minds. At each moment, a front tip of attention is supported by a broader understanding, which enables us to know things more deeply, at the background of experience. This snapshot view of mind is illustrated in figure 7.

Figure 7



In effect, we seem to have two different kinds of knowledge in our minds.

- On the surface, we have a limited and changing perception, through which particular objects appear and disappear.
- Beneath the changing surface, there is a background knowledge that continues quietly, without distracting attention from the apparent objects that come and go at the surface.

Of these two kinds of experience, we habitually identify the first as 'consciousness'. We habitually assume that our knowing takes place at the changing

surface of the mind. And, accordingly, we tend to ignore the background knowing that continues at the depth of our minds.

The background depth is thus taken to be dark and unknowing. It is often called the 'unconscious'. And it is then described as a hidden activity of mind, functioning beneath the apparent surface. The mind is here conceived as though it were a physical computer. It is conceived to work by making hidden calculations somewhere inside, behind the pictures that appear on the computer screen.

But when we speak of the mind like this, we are no longer speaking of the mind at all. Instead, we are speaking of an external brain – which is perceived indirectly, through our senses and our bodies, in an outside world. And we are ignoring the more direct phenomena of mental appearances that nature shows us in our minds.

If the mind is examined more directly, our computer brains are left where they belong, in the external world. It then turns out that the surface of our minds is a picturing activity, which produces the appearances of changing objects. The picturing takes place in the course of time – as different objects are related together into larger pictures, or as an object is described through a picture that relates its component parts.

This picturing enables us to focus attention on an object – either by locating it as a particular component of some larger object, or by describing it as made from smaller parts. But is it right to identify this picturing and focusing activity as 'knowing' or as 'consciousness'?

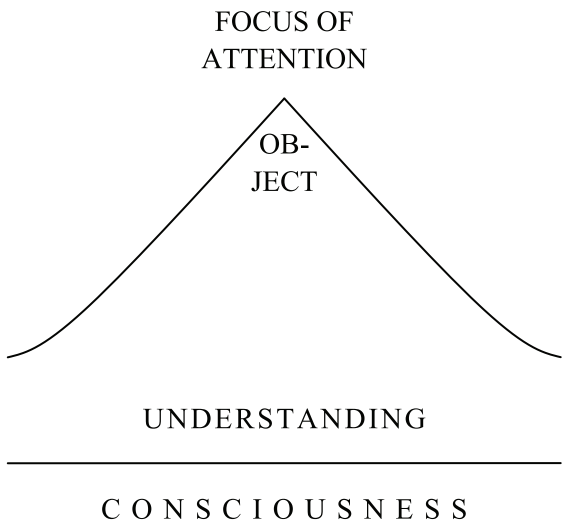
Not really. The picturing and focusing of mind is only an activity that produces appearances. All these appearances are known by consciousness, which is their knowing light. As each appearance is produced, it is illuminated by the light of consciousness.

That knowing light is the common principle of all experience. No matter what appears or disappears, consciousness is present there. Without its light, nothing could appear or disappear. No matter what may come and go, consciousness stays always present. It shines by its own light, illuminating everything that comes and goes. And so it continues always, throughout all changing objects and activities.

For any object to appear, it must be known by consciousness. That knowing is a quiet light, which does not distract attention. As objects come and go at the changing surface of our minds, they are illuminated by a consciousness that always continues, at the underlying background of experience.

In fact, that background is just consciousness itself. The background is not dark and unconscious, as it first appears. It appears this way because we assume that knowing is a mental activity. But when this assumption is questioned, it turns out that knowing is a quiet light which shines from beneath all changing objects and activities. It shines from the underlying background – as nothing else but light itself, remaining always unaffected and unchanged.

Figure 8



It is from there, from unaffected consciousness, that mind arises. That is the underlying basis of the mind, at every moment that the mind produces an appearance of some object in the world. This conception is illustrated in figure 8 (previous page). It is much the same as the preceding figure 7, except that the underlying background is now called 'consciousness'.

Learning from experience

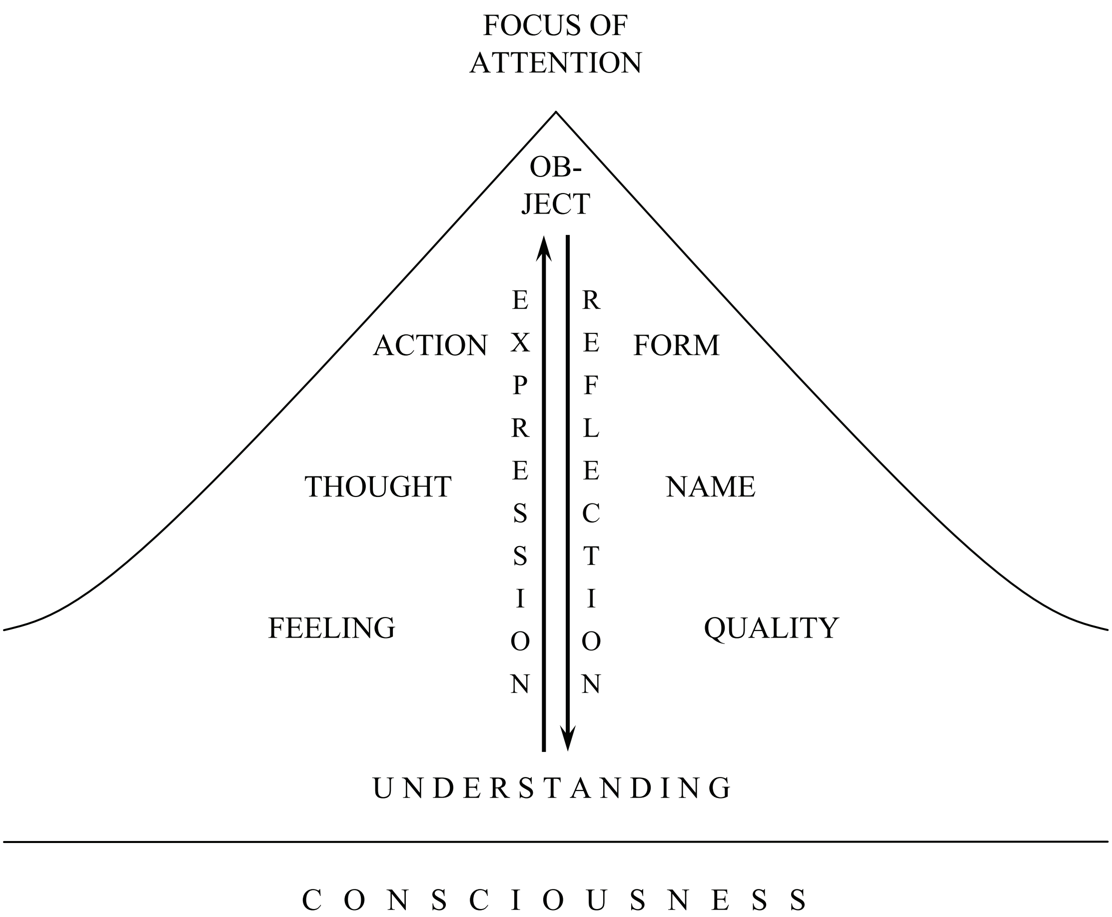
But how does the mind arise from its underlying consciousness? What is the energy that drives the mind's activities, as they produce their changing show of apparent objects? That is the living energy called 'prāṇa'. It is the energy through which the mind arises and keeps turning from one object to another.

From underlying consciousness, understanding is expressed, in our perception of objects. As each object appears, its perception expresses an understanding that continues from the past. The expression has come up through feelings, thoughts and actions that have turned attention to the object, thus making it appear. This is an upward and outward expression – which takes place through mind, towards a perceived object.

But the living energy of mind is not merely outward. When it has brought an object into appearance, there is then a reflection back, as the appearance is interpreted and taken into understanding. So there is a cycle of expression and reflection, which is shown by the upward and downward arrows in figure 9.

The expression is shown rising on the left, through feeling, thought and action.

Figure 9



And the reflection is shown on the right, as it passes down in reverse, through the same levels that brought the expression up. At the level of action, the object's form and its transformation are observed. At the level of thought, the object's name and meaning are conceived. And at the level of meaning, the object's quality and value are judged.

In the process of experience, this cycle keeps on repeating, through a succession of objects that get to be perceived. Each repetition starts with an understanding that continues from the past. This understanding gets expressed – through feeling, thought and action – in some object that appears. The appearance is then interpreted – through its form, its name and its quality – thus assimilating it, into a new state of understanding. In its turn, this new state gets replaced by future states, as perceptions are repeatedly assimilated into understanding.

It is thus that we learn from experience, through a repeated cycle of expression and reflection – which keeps taking our attention out to objects and reflecting that attention back into underlying consciousness.

Microcosm and macrocosm

If you look again at figure 9 (previous page), you will see that it shows a changing and differentiated manifestation of nature's activities, in the microcosmic experience of each living individual. Here, nature is shown manifesting itself in a living microcosm of individual activity, through which each one of us perceives an external universe.

As anyone perceives the world, it is always through this living microcosm. Here, at each moment of mental time, a particular object appears at the focus of attention. But, underneath this limited and changing appearance, the world as a whole is more broadly and more deeply understood, at a knowing background that persists through all difference and change. As time passes in each mind, there is a stream of apparent objects – which are assimilated at their persisting background, into a continued knowledge of the world. It is thus that each object is perceived and interpreted, as part of a larger world.

All of our perception here depends, inherently, upon a correspondence that we must assume between each individual microcosm and the universal macrocosm of the outside world. Without that correspondence, no perception, thought or feeling could be understood to show us anything beyond the stream of appearances that succeed each other in our minds.

A modern physicist depends upon that correspondence, just like anyone else. In order to conceive the world more clearly and completely, a scientist must question unexamined assumptions; and the questioning is thus turned inward. It is then reflected down, beneath the foundations of our built-up picturing, into a subjective depth of mind.

Such a reflection inward most certainly implies a basic correspondence, between the inner microcosm of individual experience and the outer macrocosm of the world at large. That correspondence is implied no less in modern physics than in other sciences. But the correspondence is outside the scope of modern physics. It cannot be investigated and described by modern physics; because it essentially involves our inner processes of thought and intuition, which do not work in the outside world. Instead, they work by expressing consciousness in mental time.

In the older sciences, the macrocosm-microcosm correspondence has of course been long conceived – as an examined fact of the process of learning that we experience in our particular lives and minds, and in their containing world outside. A common functioning of nature is thus found, both in each individual microcosm and in the universe at large.

Three constituting qualities

That common nature is described through a three-fold analysis, which has been handed down in the Indian tradition. Here, nature's functioning is analysed as an interweaving of three constituting qualities, called 'guṇas'. A 'guṇa' is literally a 'strand', of which a string or rope is made. The guṇas are thus conceived as three elemental strands of quality which are twisted and interwoven together; so as to form a continued string or fabric of experience and happening, in the course of time.

In a passage from the *Bhagavad-gītā*, the three guṇas are clearly described, in the process of our embodied experience. First, we are told that the living principle which is embodied stays the same, as unaffected consciousness. But changing limitations are superimposed upon its underlying changelessness, by the interweaving of differentiated qualities.

sattvaṁ rajas tama iti guṇāḥ prakṛti-sambhavāḥ .	In nature's happening, there are three constituting qualities – called '*sattva*', '*rajas*', '*tamas*'.	
nibadhnanti mahā-bāho dehe dehinam avyayam ..	In the body, Arjuna, they limit the embodied principle; though in itself it stays unchanged.	*14.5*

Next, the three qualities are described as personal limitations. *Sattva* limits personality by attachment to embodied knowledge and well-being. *Rajas* colours and distorts experience by attachment to passion and achievement. And *tamas* gets life stuck in carelessness and ignorance.

tatra sattvaṁ nirmalatvāt prakāśakam anāmayam . sukha-saṅgena badhnāti jñāna-saṅgena cā 'nagha ..	There, *sattva* is what shines – from purity, set free from ill and harm. This brings in limitation, Arjuna, by holding on to comfort and to knowledge that is known.	*14.6*
rajo rāgā-'tmakaṁ viddhi tṛṣṇā-saṅga-samudbhavam .	You should know *rajas*, Arjuna, as made of passion, rising up inflamed with craving and attachment.	
tan nibadhnāti kaunteya karma-saṅgena dehinam ..	That brings limitation onto the embodied principle, by holding on to what is done.	*14.7*
tamas tv ajñāna-jaṁ viddhi mohanaṁ sarva-dehinām . pramādā-'lasya-nidrābhis tan nibadhnāti bhārata ..	And *tamas* you must know as stupefying, born of ignorance. It limits all embodied beings, Arjuna – by blind intoxication, laziness and sleep.	*14.8*

sattvaṁ sukhe sañjayati
rajaḥ karmaṇi bhārata .
jñānam āvṛtya tu tamaḥ
pramāde sañjayaty uta ..

From sattva comes attachment to
well-being; and from rajas comes
attachment to activity.
But tamas covers knowledge, and
thus makes for an attachment to
intoxicated lack of care. *14.9*

Then, each quality is described as sometimes predominating over the other two, thus giving rise to a variety of changing effects.

rajas tamaś cā 'bhibhūya
sattvaṁ bhavati bhārata .
rajaḥ sattvaṁ tamaś cai 'va
tamaḥ sattvaṁ rajas tathā ..

Predominating upon rajas
and on tamas, sattva rises,
Arjuna. So also rajas,
upon sattva and on tamas.
And thus tamas in its turn,
upon sattva and on rajas. *14.10*

sarva-dvāreṣu dehe 'smin
prakāśa upajāyate .
jñānaṁ yadā tadā vidyād
vivṛddhaṁ sattvam ity uta ..

When light arises at all portals
in this body, then it may
be known that *sattva* has matured. *14.11*

lobhaḥ pravṛttir ārambhaḥ
karmaṇām aśamaḥ spṛhā .
rajasy etāni jāyante
vivṛddhe bharata-'rṣabha ..

Ambition, enterprise, exertion,
restlessness and zest: all these
arise in *rajas* growing forth. *14.12*

aprakāśo 'pravṛttiś ca
pramādo moha eva ca .
tamasy etāni jāyante
vivṛddhe kuru-nandana ..

Obscurity, inertia, driven
madness and delusion: these
arise in *tamas* growing forth. *14.13*

karmaṇaḥ sukṛtasyā 'huḥ
sāttvikaṁ nirmalaṁ phalam .
rajasas tu phalaṁ duḥkham
ajñānaṁ tamasaḥ phalam ..

Where action is well done, its fruit
is pure, called 'sāttvic'. But the fruit
of rajas is discomfort; and
of tamas, it is ignorance. *14.16*

sattvāt sañjāyate jñānaṁ
rajaso lobha eva ca .
pramāda-mohau tamaso
bhavato 'jñānam eva ca ..

From sattva, knowledge comes. From
rajas, eagerness and greed. From tamas,
madness and delusion come
about, along with ignorance. *14.17*

And finally, it is described how nature's qualities and all their limitations may be transcended.

nā 'nyaṁ guṇebhyaḥ kartāraṁ
yadā draṣṭā 'nupaśyati .
guṇebhyaś ca paraṁ vetti
mad-bhāvaṁ so 'dhigacchati ..

When it is seen that there's no doer
other than these constituting
qualities, and when the see-er
knows beyond the qualities,
that see-er reaches my own state. *14.19*

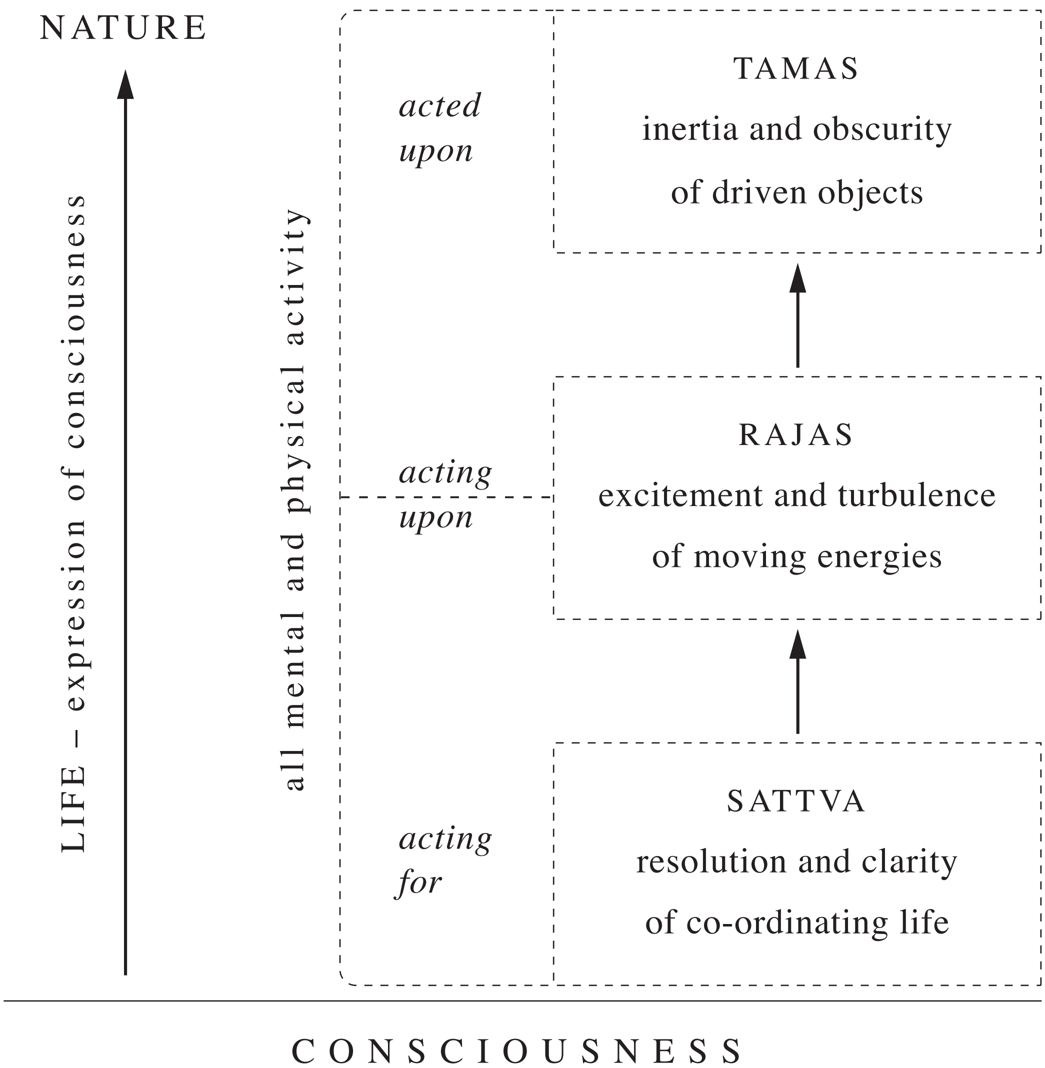
guṇān etān atītya trīn
dehī deha-samudbhavān .

Transcending these three qualities
through which the body has arisen,

janma-mṛtyu-jarā-duḥkhair vimukto 'mṛtam aśnute ..	one who is embodied finds undying freedom – unconfined by being born into a world where life degenerates and dies. *14.20*
brahmaṇo hi pratiṣṭhā 'ham amṛtasyā 'vyayasya ca . śāśvatasya ca dharmasya sukhasyai 'kāntikasya ca ..	For I am the supporting ground of all reality – unchanging, deathless, permanent, unshaken always from what's right – at peace with that which *is*, in its own self, unmixed with anything besides. *14.27*

The transcendence here described is a pure see-er that is found at one with all being, utterly unqualified and thus completely free of all attachment. Even the clarity and goodness of sattva is a limitation, because it is only a *relative* clarity and goodness of embodied knowledge and well-being. Such a relative clarity or goodness is only clearer or better than other things that are more obviously unclear or bad. Something

Figure 10



of the opposite is still implied. And so it is inevitable that the opposite is confusingly mixed in.

Such a confused mixture is inherent in embodiment, where knowledge and well-being can never be completely true or real. True knowledge and well-being can only be achieved by returning to the subjective principle of consciousness, whose very being is to know. That knowing is no changing act. Instead it is the unaffected being of pure consciousness, which cannot be qualified. There, sattva as a quality is utterly dissolved.

As a quality, sattva cannot be located in the unaffected ground. Instead, it must occur at an overlying level of appearance. This brings us to a further consideration of the three guṇas. They are not just interweaving strands of quality. They are also a hierarchy of levels that arise from consciousness, as nature manifests the world. An illustration is shown in figure 10 (previous page).

- Tamas is the most superficial level, furthest away from underlying consciousness. At this level, nature is *acted upon*. It is characterized by the inertia and obscurity of driven objects in the world.
- Rajas is the intermediate level, where nature *acts upon* objects. It is characterized by the excitement and turbulence of moving energies, through which we may begin to transcend the inertia and the blind opacity of driven objects.
- Sattva is nature's underlying level, immediately expressed from consciousness. This is the co-ordinating level at which nature is found everywhere alive, *acting for* the sake of consciousness. Here, nature's driving energies are tacitly inspired by the resolution and the clarity of that continued knowing which is at once their common background and their inmost source of life.

This threefold hierarchy applies to all of nature, to all mental and physical actions, both in our microcosmic personalities and in the macrocosmic world. The ground of consciousness may be attained through transcendence, but it is also immanent in everything.

Levels of enquiry

Gross and subtle

In any scientific discipline, there is a progressive investigation from the gross to the subtle. As we investigate our ordinary perceptions, it turns out that they are coarse and provisional. They provide us with impressions that are not fully accurate and clear. So they need to be refined by a more thorough examination, which looks at them more closely and which takes other things into account.

As scientists thus look more closely, they discover a variety of finer details and learn to make more delicate distinctions. Accordingly, our scientific pictures get more detailed and discerning. Our sciences develop a more finely textured picturing – which makes more careful distinctions than we usually discern, with our ordinary senses and ideas.

But, as we distinguish things more finely, we have also to consider more abstract ways of relating them together, in our pictures and descriptions of the world. As our distinctions get finer, we uncover a greater variety of different things. So, to relate these different things coherently, we have to go deeper down, into underlying principles that are shown in common.

The underlying principles are general. As such, they are described abstractly – in a relatively simple way, uncluttered by the distracting variety of differences that are shown by their particular instances. But the abstraction comes at a price. As general principles are abstracted from their particular instances, they have to be recognized and understood more subtly, beneath our gross perceptions of their manifest particulars.

Thus, as our sciences develop, they proceed in two opposite directions.

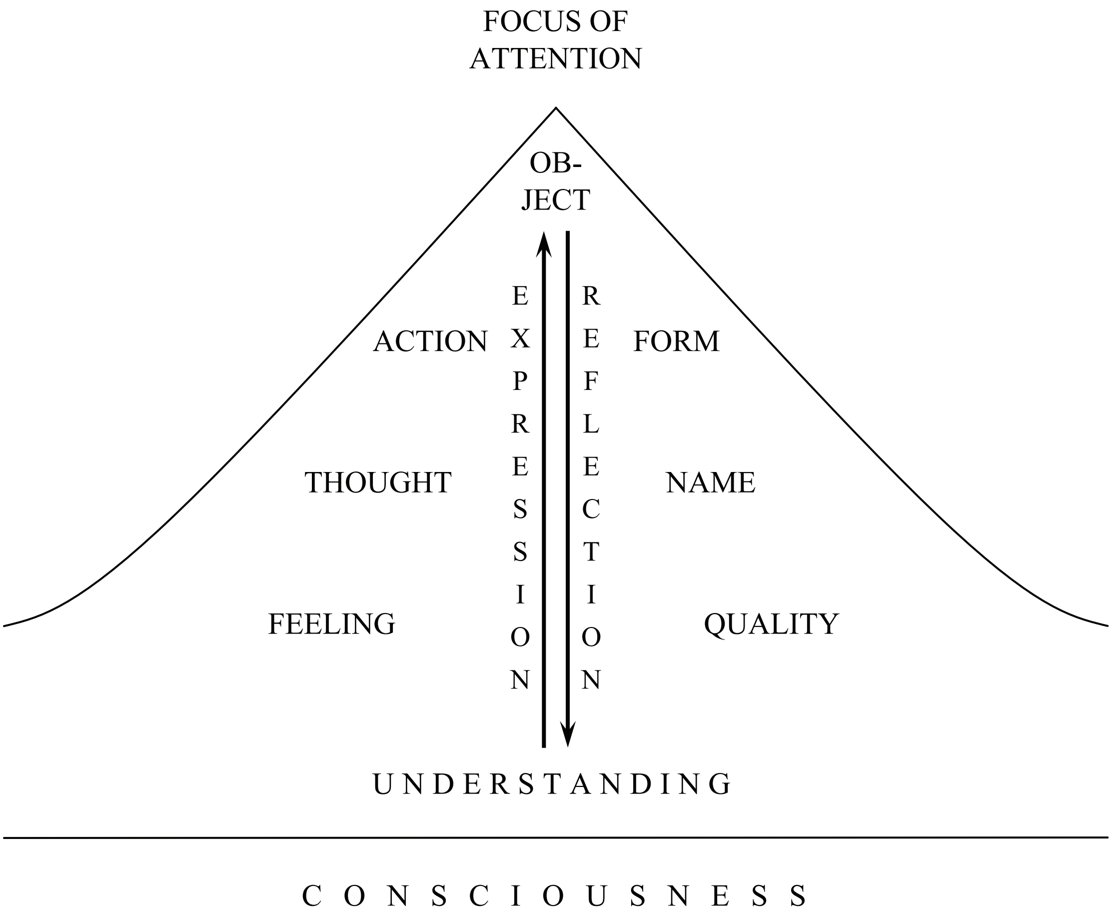
- On the one hand, they distinguish different things; and so they build up pictures that get more and more complicated, as more details are described.
- But on the other hand, to picture things coherently, our sciences must reason more abstractly, by going down to deeper principles that are more subtly considered and more delicately recognized, beneath the distracting show of differentiated picturing.

These two directions are quite clearly seen in modern physics.[13] As it builds *up* its complex pictures, it also goes *down* – at least implicitly – into deeper levels of consideration, at which the world is more subtly pictured and more deeply investigated.

In the older sciences, such a descent into deeper levels is described quite explicitly and systematically, though often in a way that is somewhat mythically or metaphorically expressed. As discussed in the last talk (figure 10), the old concept of three guṇas is a hierarchical division. The guṇas are not just three interweaving strands of quality. They also show three levels, at which nature is made manifest.

At the level of *tamas*, we see gross objects, which react with inertia and obscure our view of other things. At the level of *rajas*, we are more subtly involved – through our feelings, thoughts and actions – in the excitement and turbulence of nature's moving energies. And at the level of *sattva*, we take part in an underlying harmony of nature's life – which we experience even more subtly, beneath the conflicting and confusing appearances that we perceive through our bodies and our minds.

Figure 9
(from previous talk)



Layers of personality

If you look once again at figure 9 (from the previous talk), you will see that the three guṇas are also represented there. *Tamas* is represented by the object at the focus of attention. *Rajas* is represented by the cycle of expression and reflection, which keeps arising from below and returning down again. And *sattva* is represented by understanding, which continues at the background of underlying consciousness.

But here, in this figure 9, the analysis is a little more elaborate. The activity of rajas is more elaborately shown – not as a single level, but instead as three. So, instead of the three guṇas, we have a more elaborate division of nature, into five. Here, five levels of the world are shown, as experienced through five layers of personality.

- At the top, there is a level of objects, where our limited attention gets focused. These objects are experienced through our bodies, which themselves are outward objects in the world.
- Next is a second level, of action and form. Here, action turns attention to various objects, and our experience is given shape. The actions and the forms of world are experienced through our living faculties, through which we function as partaking organisms in the environments that we inhabit.
- Third is a level of thought and name. Here, thoughts direct our actions, and names are used to describe the forms that we perceive. It's through our conceiving intel-

lects that we find the world intelligible, as we interpret names and thoughts that make our observations meaningful.

- Fourth is a level of feeling and quality. Here, feelings motivate our thoughts and acts, through an intuitive judgement of qualities and values. It's thus that we appreciate the character of things that motivate us in the world.
- And fifth, there is a level of understanding, which expresses knowledge and assimilates what has been learned. It's here that we find common principles of continued existence, in the variety of changing phenomena that nature keeps on showing us.

These five levels have long been conceived, in many old traditions. In Sanskrit, they are described as taking place through a five-fold division, called 'pancī-karaṇa' or 'making five'. When this division is applied to our individual experience, it results in five layers of personality. Each layer is called a 'kosha' or a 'covering'. There are thus five 'koshas' or coverings, which must each be uncovered or penetrated, on the way to a self that is found within.

- The outermost layer is called the 'annamaya kosha' or the 'covering of food'. It is a person's body, seen as a material object. Through this body, other objects are perceived, in a world of matter.
- Proceeding inwards, the second layer is called the 'prāṇamaya kosha' or the 'covering of energy'. Here, the body is seen as a living organism, made of flowing energy. The flow takes place in resonating currents, called 'nāḍis'. These currents function organically, as they resonate in sympathy with each other and with the world outside. Thus, they form an organic pattern of living activity, which perceives a functioning world of fluid energy and happening.
- The third layer is called the 'manomaya kosha' or the 'covering of mind'. It is the conceiving intellect, made up of thoughts and descriptions. Through the interpretations of thought, it conceives an intelligible world of meaningful information.
- The fourth layer is called the 'vijnyānamaya kosha', or the 'covering of discernment'. Here, quality and value are discerned. The discernment is made up of our intuitive judgements and our inner feelings. They carry out the contrasts and comparisons that show a qualitative world of motivating value.
- The fifth layer is called the 'ānandamaya kosha' or the 'covering of happiness'. Here, the word 'happiness' refers to harmony and integration. This is the coordinating layer of personality. It is made up of assimilated understanding. Through it, we comprehend the continuity of common principles, beneath the change and the variety of superficial appearances.

Within these five coverings, there is an inmost self, called 'ātman'. In it, there is no trace of body, nor of mind. There are no objects, actions, thoughts, feelings, or states of understanding. All change and difference belong to the coverings of personality.

The self within is consciousness, unmixed with any coverings. Viewed indirectly from outside, through its expressions in the coverings of personality, it seems at first to be restricted in space and time, within the bounds of a limited body and mind that are seen surrounding it.

But by reflecting back to it, beneath its outer coverings, it turns out to be less and less limited, as the reflection goes deeper in. For then it is experienced more directly,

and the experience broadens without limit – until it is finally realized as an undifferentiated ground, beneath all differentiated show of personality in world. That's what has been illustrated in the previous figure 9.

Elements of world

Through each layer of our microcosmic personalities, we experience a corresponding level of the macrocosmic world. So, when the five-fold division of pancī-karaṇa is applied to the world, it results in five levels of macrocosmic appearance. These five levels have been somewhat metaphorically conceived as the old five elements – which are called 'pṛithivī' or 'earth', 'āpas' or 'water', 'tejas' or 'fire', 'vāyu' or 'air', and 'ākāsha' or 'ether'.

In Sanskrit, these elements are called the 'panca-mahābhūtas' or the 'five great becomings'. They are called 'elements' in the sense that we habitually combine them together, in a rather confused and misleading way, as we conceive our usual pictures of a physical and mental world. But, in the old texts, it is made clear that these so-called 'elements' belong to different levels of manifestation, which need to be distinguished carefully.[14]

In this old analysis of nature, its divided elements are not meant to be combined at a single level of the outside world, like the periodic elements of modern chemistry. Instead, they are meant to describe a progressive reflection from the gross to the subtle – through different levels that must each be left behind, one after another, on the way to an underlying ground from which nature is made manifest.

Because the old elements are metaphorically described, they can be interpreted in many ways. One such way is summarized in figure 11 (next page). It shows a modern interpretation, in the context of our current scientific disciplines – including both the outward sciences that have been greatly developed in recent times, and also those inward disciplines whose basic principles are said to have been handed down from very ancient traditions.

- At the level of *'earth'*, we perceive what appear to be pieces of matter in the world. Here, it is taken for granted that nature is perceived through our external bodies. Modern physics makes this assumption, and it is necessarily applied through instruments that are used and fabricated through our external bodies.
- However, on further investigation, it turns out that pieces of matter are a somewhat crude appearance. What seem to be material objects are more accurately described as dynamic patterns of transforming energy. We are thus led to a level where nature appears through a changing flow of manifested happening. This is the level metaphorically described by the old element *'water'*.

  This level is considered both in modern physics and in the old sciences. In either case, energy is analytically described – as forming complex patterns of vibration and radiation, in an underlying field conditioning of space and time.

  But, in modern physics, the description is purely structural and mathematical. It works entirely through structured calculations and external instruments, which cannot rightly conceive how consciousness may be expressed through a living energy.

  In the old sciences, nature is considered in a less restricted way. They do not confine their examination to perception through our external bodies. Our observations of nature are no longer considered to take place through external bodies and

Figure 11

Traditional element	*Level of appearance*	*Examining instrument*	*Scientific disciplines*
'Earth'	Pieces of matter	External body	Modern physics
'Water'	Transforming energy	Organic faculties	Biological sciences
'Fire'	Meaningful information	Conceiving intellect	Culture studies and humanities
'Air'	Conditioned character	Intuitive judgement	Psychology and meditation
'Ether'	Continuing existence	Reflective reason	Philosophical questioning

Unchanging ground of reality and consciousness

their objects, but instead through living organisms and their faculties of mind and sense. These organisms and their faculties are not just structured objects. Instead, they are living patterns of a meaningfully organized activity. They function through the living energy of prāṇa, which inherently expresses meaning from an underlying consciousness.

In the modern sciences that we currently call 'biological', the energy considered is the same as modern physics. The very idea of a living energy is usually treated as illegitimate. But it is essential to many of the old sciences – in particular to medicine, and to astrology and alchemy. In this sense, they are more radically 'biological' than modern 'biophysics' and modern 'biochemistry'.

- When patterns of activity are further considered, they are understood to have a meaning. When their meaning is taken into count, it turns out that they are not just moving patterns. They also function as meaningful information, which tells us more about the world. We are thus led to a third level, where nature is made manifest through illuminating representations. This level is described by the old element *'fire'*. As information is interpreted, its surface show must get burned up, in order to reveal a further meaning.

  Here, in the use of information, modern physics is confined to quantitative measurements and calculations of mechanical variables like distance, time, speed, mass, momentum and energy. But older sciences go on to a much broader and deeper use of information, as we describe and conceive the world. They are thus cultural sciences, through which we educate our conceiving intellects.

These cultural sciences include linguistics, history, and diverse fields of literary and artistic studies. They do not work primarily through structured calculation, but more essentially through a living process of education. Their use of reason is to cultivate and clarify our minds.

- When information is further considered, it is found to be comparative. It shows a relative conditioning of character, in the world and in our minds. This is a fourth level, where nature manifests itself through qualities and values that are intuitively judged. This level is described by the old element *'air'*. Its qualities and values have a pervading influence, upon the objects we perceive and upon our thoughts and feelings. So it is like a pervasive climate, which keeps on influencing what we see and think and feel more narrowly.

  In modern physics, this pervasive conditioning is described by a mathematical 'field', where a quantified value is ascribed to each point of space and time. But in the older sciences, quality and value are more fully and directly investigated in the mind.

  That older investigation is through meditative practice. It seeks to expand intuition and to purify character, by repeated exercises of withdrawal from the restless turning at the narrow focus of attention. Withdrawing back into the depth of mind, a meditator seeks to develop penetrating judgements and subtle intuitions that transcend the usual limitations of the mind in space and time.

  Such meditative practice is the basis of traditional psychology. This science is concerned with the turning of the mind. In Sanskrit, each state of mind is called a 'vṛtti'. Literally, a 'vṛtti' is a 'turning'. The term is thus used to describe our mental states as cyclic transformations, each of which arises through an outward turning from a common background that stays present in them all.

  It's through this outward turning that the mind experiences what happens in the world. As anything that happens is perceived and taken in, it leaves behind a conditioned tendency. In Sanskrit, such tendencies are called 'saṁskāras'. They are assimilated at the underlying background, where they continue quietly, like dormant seeds of unmanifested potency. From that background, they influence the turning of the mind, from one state of experience to another.

  It's only there that causality and learning can continue.

- When changing character is further considered, it is found to depend on continuity. This leads to a fifth level, where nature manifests a continuing existence that carries on through change. This level is described by the old element called *'ether'*. It is a background continuity, which pervades through space and time. It thus connects all different objects and all changing states.

  In modern physics, this level is described as the 'space-time continuum', whose geometry connects all events in the world. But the old sciences consider more than geometry. They investigate a continuity that's shared in common by both world and mind. It is thus both objective and subjective. Objectively, it carries on as the background of external space and time. Subjectively, it continues through each individual's experience, as the knowing background which persists through differing appearances that come and go. It thus enables an understanding of common principles, in the differing phenomena that nature manifests.

  That understanding is investigated by reflective reasoning, in the sciences of philosophical enquiry.

Impersonal knowing?

In the end, all sciences are built on common ground, beneath the change and difference of appearances. That ground is the basis on which different scientists communicate. On it depend all scientific standards, of accurate testing and of meaningful reference.

In modern physics, that ground is considered only as an objective world, where all standards depend on objects and structures that are commonly identified. However, in the older sciences, a further consideration is investigated, by reflecting the investigation back towards a ground of knowing that is shared subjectively. Such a subjective ground is inherently impersonal. It is an impersonal reality which different people share, beneath their changing personalities.

But is there such a ground, which is at once an impersonal reality and a subjective consciousness? Can a subjective reflection reach back down, to an impersonal knowing that gets usefully expressed in effective feelings, thoughts and actions?

These questions are avoided by the mechanical testing and application of modern physics. But they are kept open and alive, in the working practice of older sciences that turn attention more directly to our lives and minds. And this presents us with something of a challenge, in our modern academic teaching and its instituted standards.

As sciences investigate more deeply, into inner levels of experience, their teaching and their practice must become more individual. Accordingly, as sciences become more inward, they become less suited to external institutions, like modern universities and schools. This applies in particular to disciplines of meditation and spiritual enquiry. Here, books and scholars and institutes are inherently peripheral. The teaching centres on an individual relationship, between teacher and disciple.

What's taught arises from an inner depth of accomplishment, attained by the teacher. It is from there that techniques are used and ideas are interpreted, to guide and inspire a corresponding accomplishment in the disciple. Such an accomplishment works deep within the personality. As it proceeds, it is meant to go further down, to a depth where it becomes more impersonal and more dispassionate, so that a truer knowledge may be found.

This is a kind of learning that goes far beyond any academic jurisdiction. It cannot be rightly taught or tested or applied by academics, in their institutional and scholarly capacity. But, on the other hand, academics do have a role to play, in maintaining and presenting information about the inner sciences.

Here, academics are in a somewhat tricky situation, as they report on inner disciplines that cannot actually be taught in an academic context. An admission is required that such disciplines are only being reported in a limited way, by describing their ideas and techniques from outside. An academic here is a very limited accountant, reporting superficially upon a scientific practice that is learned and carried out elsewhere.

Thus, in a fundamental sense, reflective disciplines of meditation and philosophy cannot be academic subjects. When academics describe these subjects, their descriptions can't be more than theoretical. The actual practice of meditating must be learned and applied through a reflective journey. So also philosophical enquiry. In either case, the journey must go back within. It must penetrate beneath its theories and descriptions, to an inner depth of individuality.

One major difficulty here is our current notion of the ‘individual’. This notion has become debased, by confusing individuality and personality. The word ‘individual’ comes from the Latin ‘individuālis’, which means indivisible. This is its essential meaning. It refers to an inner unity, at the centre of divided personality. The old sciences are intended to reflect back there, in search of a knowing that is free from the bias and distortion of our physical and mental partialities.

Physics and biology

In the previous talk, the old division of five elements was used to distinguish different kinds of scientific discipline. To explain things further, each kind of discipline can now be discussed a little more, in its own right.

Modern physics

The first kind of discipline has been called 'modern physics'. But a clarification may be needed here. This kind of discipline was most definitely investigated and practised in ancient times. Our records show that Pythagoras's theorem was known and used in ancient Egypt, in ancient Iraq and in ancient India. The use of this theorem is clearly described in the Sanskrit *Shulba Shāstras*, many centuries before its formulation by Euclid in classical Greece.

What's new in Euclid is not the measured and calculating use of mathematical deductions. That had been developing from long before. Euclid's contribution was instead a new way of formulating mathematics, in a manner that is suited to transmitting it through written documents. This way of formulation is to state explicit hypotheses, and to show how mathematical results are derived from them. Through this explicit formulation, of hypotheses and deductions, we make calculating models of structures in the world. And we use these models to predict some particular results in the phenomena that nature shows us.

In the last few centuries, since Galileo and Newton, this mathematical modelling has greatly developed the kind of sciences that we now call 'physical'. The modelling works mechanically, through the use of printing and other media that have increasingly mechanized our recording and processing and transmission of information. But the mechanization has a restricting effect. Its calculating method is restricted to an external world of structured space. This is the world to which we apply our physical sciences. And we think of these sciences as 'modern', in the sense that they have been greatly developed in recent times.

So, when we speak of 'modern physics', it can be useful to remember two things.

- First, as we use the word 'modern' here, it does not mean 'new'. Modern physics is in fact an old science – whose roots go a long way back, into an ancient past. This science is 'modern' only in the sense that it has received a special emphasis in recent times, so that a large part of it has been developed recently.
- And second, as we use the word 'physics' now, it has a meaning that has been restricted recently. In older times, before Newton and Galileo, the words 'physics' and 'physical' were used in a far broader way than they are today. In their older usage, these words referred to all of nature, which the Greeks called 'phusis'. That nature includes activities of mind, which are today excluded from the external world of modern physics.[15]

In fact, our modern physics has deep roots in the older conception of nature. The roots are much deeper than is generally recognized. As described in a previous talk (figure 4), modern physics has developed five levels of consideration.

- First, a Newtonian level, where objects are considered as *pieces of matter* that interact through force, in a world of static and dynamic structures.

- Second, a quantum mechanical level, where systems of mechanical activity are considered to evolve through *transforming states* that get disturbed, jerkily and unpredictably, by material observations and interactions.
- Third, an initial level of the theory of relativity, where measurements of space, time and matter are considered as *relative observations* – which vary from one observer to another, but which show invariant principles that are the same for all observers.
- Fourth, a quantum field level, where space and time are *conditioned by subtly fluctuating fields* – which are not observed directly, but which exert a driving force on the objects we observe.
- And fifth, a further level of the theory of relativity, where force is considered to be an appearance of geometric curvature, in the *space-time continuum*.

If you look again at these five levels, you will see that they correspond to the old five elements. At the Newtonian level, its pieces of matter show that it corresponds to the element ‘earth’. At the quantum mechanical level, its transforming states show that it corresponds to ‘water’, which is the element of transforming change. At the preliminary level of relativity theory, its relative observations show that it corresponds to ‘fire’, which is the element of intelligible information. At the quantum field level, its subtle conditioning shows that it corresponds to ‘air’, which is the element of subtly transmitted influence. At the further level of relativity, the space-time continuum quite clearly corresponds to ‘ether’, which is the element of pervading continuity throughout all space and time.

In modern physics, these five levels were not explicitly developed with the old five elements in mind – except, that is, for the space-time continuum, which did develop in connection with the element ‘ether’. But there is a correspondence – which reflects back implicitly, into the ancient roots of modern physics.

This correspondence also shows a basic difference, between modern physics and the old conceptions. Modern physics has no way of conceiving life and mind, as expressing an underlying consciousness. Even at its deepest level, where it considers the space-time continuum, modern physics is obliged to think in terms of space and structure.

In this physical continuum, time is no more than the fourth dimension of a four-dimensional structure. It is a special dimension – which gets specially treated in the calculations, by multiplying it with the square root of minus one. But that special treatment does not make it any more than a structural dimension. It is just one dimension among four, in a structured geometry that is built up by relating co-existing points. Here, each event is treated as though it were a geometric point, co-existing with each other such point and hence with each other event. The entire universe of all events is thus conceived all at once – as though it were a four-dimensional space, with no passing time in it.

In this physical conception, all passing time is inherently reduced to co-existing space. There is no room to consider our experience of mental time – where different moments never co-exist, but only replace each other, as they each pass by. Accordingly, there is no room to consider our experiences of life and mind – where living feelings, thoughts and actions keep on rising up and passing on, as they each express an underlying consciousness and get assimilated back in it.

In order to conceive of life or mind, modern physics cannot do any more than make calculating models that mechanically predict or simulate the behaviour of living creatures. As modern computers and their information technologies are showing us today, it can be quite useful to develop a mechanical prediction and simulation of our living behaviour. And it would be quite self-defeating to try imposing formal limits on how far such prediction and simulation can go. No formal limit that we conceive could be final, because it could only be based on currently accepted ideas and beliefs that must be open to further questioning.

But, no matter how successful a prediction or a simulation might be, it cannot in itself amount to a living expression of consciousness. Its success can only be a matter of outward behaviour – which still remains to be interpreted, before we can treat it as alive. The most successful of simulations cannot substitute our living faculties, no more than a painted picture can. Beyond any simulation or any picture, our living faculties are essential, in order to find consciousness expressed. No simulation nor any picture can express consciousness for us, without that simulation or that picture being used and interpreted – by living faculties that reflect subjectively, back into their underlying consciousness.

Accordingly, all simulations and all pictures only function as extensions of our living faculties – which modern physics must assume, as it constructs its theories and applies them. For any further examination of those living faculties, beyond our mere assumptions and beliefs, we have to engage in a rather different kind of science.

Medicine

In the sciences of life, there are two aspects of concern. On the one hand, there is the living body – with its structures, its mechanisms and its chemistry. On the other hand, there is an organic functioning, whereby consciousness becomes expressed, in the physical activities of living bodies in the world.

Of these two aspects, the first involves a judicious use of modern physics. And the second requires a rather different approach, which is the proper method of the life sciences. This combination of two aspects can be clearly seen in the sciences of bodily medicine.

In modern Western medicine, the bodily aspect has been greatly emphasized, through the use of modern physical technology and through recent advances in anatomy and bio-chemistry and molecular biology. This emphasis has of course been very useful, in its own way, as it has applied some advances of modern physics to our descriptions and our treatment of living bodies and their behaviour in the world.

But it needs to be understood that biology cannot rightly be treated as a branch of modern physics. No branch of modern physics can address the living aspect of organic functioning. As things stand at present, when we speak of ‘physical biology’ or ‘bio-physics’ or ‘bio-chemistry’ or ‘molecular biology’, these disciplines are no more than special branches of modern physics. They have no way of conceiving life in its essential sense, as expressing a subjective consciousness in the bodies and the happenings that nature manifests to us.

So, while some branches of physics can work in a helpful partnership with medicine and with other sciences of life, no branch of physics can itself be a life science. When a doctor treats a patient, for the purpose of some living therapy, there is always something more involved than mere physics and mechanical technology. There is an

organic functioning that has to be treated quite differently – through living faculties that work subjectively, by arising from within.

In old medical traditions, the physical aspect is generally less emphasized and less developed than in modern Western medicine. But the organic and biological aspect is generally more emphasized and may be more developed, in a variety of ways. For example, let us consider the old Indian system of Āyurvedic medicine.

Here, in Āyurveda, the treatments are mainly physical, in their administration. They are mainly applied to the physical body – including drugs to be ingested orally or nasally, or lotions and ointments and oils to be applied to the skin, or massages and manipulations, or some surgical procedures, or dietary prescriptions and other forms of regimen. So far this is similar to modern Western medicine.

But there is a difference in the way that the treatments are conceived to work. Āyurveda acknowledges, of course, that its treatments are applied to the 'annamaya kosha' or the material body that is 'made of food'. And it also acknowledges that its treatments have a structural and mechanical aspect, in which the body is regarded as a physical object. But this is not the aspect that is emphasized, in what the treatments are meant to do.

The emphasis of treatment is not meant to be mechanical. It is not meant to work primarily through the mechanical action of one object upon another. Instead, it is meant to work organically, by drawing upon the living capabilities that activate and regulate the body's functioning. That organic working does not act from one object to another. It always implies a reflection back to an inner depth of subjectivity, from where all living capabilities are drawn. It is from there that all living actions must renew and refresh their energy, in the course of their organic functioning.

So, while Āyurvedic treatments are applied to the external body, they are meant to work by stimulating a deeper response, which draws upon a subtler energy that is renewed from within. Accordingly, the body is conceived as a material expression of more basic principles that appear through its rather complicated and often problematic functioning.

The basic principles are subjective and spiritual, but they give rise to a body that is objective and material. The theory of Āyurveda tells us how this body is derived, through a series of divisions that produce the differentiated variety of our objective bodies and their material world.

The first division is between puruṣha and prakṛiti, or in other words between illuminating consciousness and self-manifesting nature. Nature manifests itself through a generic or universal intelligence called 'mahat'. The word 'mahat' means 'great' or 'unlimited'. It thus describes an unlimited intelligence that includes within itself all seeds or potentialities of manifesting nature. As we look more deeply into this unlimited intelligence, it is further seen to include the universal principles and laws which regulate the ordered functioning of nature – as nature manifests its differing potentialities, into a great variety of particular occurrences that are observed in the world.

The differentiation of manifested particulars is caused by 'ahankāra' or 'ego'. This is a false identification of knowing self with doing mind and body. Here, in this false identification, the unaffected illumination of consciousness is seen mistakenly. It's seen confused with the affected feelings, thoughts and actions of a particular mind and body that nature manifests in the apparent world.

Through this confusion of ego, an undivided and unchanging consciousness appears divided into a variety of changing personalities, with particular minds and bod-

ies that perceive a world of conflicting particulars. The ego thus gives rise to an element of conflict and discord, which is seen to disturb our minds and bodies and the world that they perceive.

In Sanskrit, this disturbing element is described as 'vikṛiti' or 'alteration'. It is an unhealthy alteration that gets superimposed on the underlying harmony of 'prakṛiti' or 'nature'. All illness or disease is here conceived as a mistaken superimposition that takes place in our bodies and our minds – which we identify, quite wrongly, as our selves. And all therapy is thus conceived to work through a return to the true harmony of underlying nature, beneath our physical and mental superimpositions.

The three guṇas and the five elements are conceived as basic principles, which arise in 'mahat' or 'generic mind'. This is a deep level of nature, which is shared in common by our individual microcosms and the macrocosm that contains them all. Here, harmony prevails, and so the three guṇas and the five elements are regarded in a positive way. They are relatively virtuous principles, found at the depth of mind, close to the knowing background underneath.

However, as the same three guṇas get expressed in the material body, they give rise to a division of three 'doṣhas' or three 'faults', which get aggravated and thus need correction. So, at the level of the body, health is described in a rather negative way. It is described as a balance between three 'doṣhas' or 'faults', which drive the body to imbalance and disease.

The three doṣhas are 'vāta' or 'wind', 'pitta' or 'bile', and 'kapha' or 'phlegm'. Each doṣha is a mixture of two elements. And the mixture corresponds to one of the three guṇas. Through this correspondence, each doṣha has a natural state, in which it contributes to harmonious functioning. But it also has an aggravated state, which disturbs the body's balance and thus brings about ill-health and disease.

- Vāta is the doṣha or the fault that derives from the clarity and resolution of sattva. Here, the elements 'ether' and 'air' are combined, so as to maintain sensitivity and co-ordination. But sensitive movements are liable to over-react; so that their natural functioning can get disturbed or dried up or blocked, through unbalanced co-ordination and control. Then vāta is shown up as an aggravated fault; and the body suffers symptoms of restless incoherence, roughness, dryness, obstruction, fatigue and cold.
- Pitta is the doṣha or the fault that derives from the excitement and turbulence of rajas. Here, the elements 'fire' and 'water' are combined, so as to stimulate appetite and to promote transforming energies. But when appetites get over-stimulated, they also promote corruption and polluting waste. Then pitta is shown up as an aggravated fault; and the body suffers symptoms of unsettled hunger and thirst, bilious yellow discolouring, malodorous secretions, inflamed irritations or eruptions, and burning heat.
- Kapha is the doṣha or the fault that derives from the inertia and obscurity of tamas. Here, the elements 'earth' and 'water' are combined, so as to stabilize the body's structure and to provide a fluid interconnection between its moving parts. But structural stability can get in the way of needed transformation; and changing connections can confuse and obscure the sensitivity that co-ordinates the body's functioning. Then kapha is shown up as an aggravated fault; and the body suffers symptoms of sluggishness, heaviness, weak digestion, bloodless pallor, sticky mucus, breathlessness, exhaustion and lack of interest.

These three doṣhas work together, each one balancing the other two, when the body functions in a state of natural health. They thus provide a way of describing the body as an organic system, where nature is seen functioning in various pathways of activity. The pathways are called 'srotas' or 'flowing currents'.

The srotas are conceived to make up a variety of organic systems, through which the body functions. But the srotas are of different kinds. At their crudest, they are physical tubes – through which matter passes – like the blood vessels or the intestines. More subtly, the srotas may be metabolic pathways of physical and chemical activity, through which food is broken down and used to nourish growth or to fuel energy. More subtly still, the srotas may be organic pathways of the living energy called 'prāṇa'.

Just like the energy of modern physics, that living energy works through a field conditioning of space and time. But in its living aspect, it cannot be described by an outward calculation of mere quantities. Instead, its description is inherently reflective, through subtle qualities that are discerned and judged by living intuition. The description is applied through an inward sharpening of just that intuition, as it reflects into the depth of mind.

In order to build a more detailed description of how the body works, the five-fold pancī-karaṇa distinction is applied again, to each of the three doṣhas. There are thus five vāyus – which are forms of motivating and co-ordinating energy, very crudely and partially represented by the electro-magnetic and chemical messaging of the nervous and hormonal systems in modern physiology. Similarly, there are five pittas – which are forms of digesting and processing heat, represented crudely and partially again by modern chemical descriptions of metabolic process. And there are five kaphas – which are forms of lubricating and connecting fluidity, again represented crudely and partially by modern physical descriptions of liquid flow and circulation in our living bodies.

Thus, like other traditional sciences, Āyurveda builds up complex descriptions by a progressive analysis that is inherently psychosomatic. The analysis begins with psychic principles – which are taken to be universal, at an inner depth of mind. From there, the analysis proceeds to describe a variety of outward particulars – which are observed and treated through our living faculties, in a physical and mental world.

In modern physics, there is a very different approach. Modern physical descriptions are built up synthetically, from microscopic units like particles or waves. All objects and events are described through complex structures of such microscopic units – which are observed and treated through external instruments and machines, in a restrictedly physical world.

But then, how can our restrictedly physical descriptions be related with the psychosomatic descriptions of living medicine? How can our physical and chemical and electro-magnetic descriptions be used, in relation to the psychosomatic functioning that is observed and treated in our living bodies? These questions can't be answered from the restricted perspective of modern physics. An older and broader consideration is essentially involved, in conjunction with our modern physical descriptions.[16]

Ritual and astrology

In the old conceptions, the universe is considered biologically. And the biology is radical. In Sanskrit, the universe is called 'jagat' or 'moving'. It's thus conceived that the entire universe is made of animated movement, which expresses consciousness.

Here, it is not objects that give rise to movement, but the other way around. Each object is considered as a crude appearance of more subtle energy that is essentially alive.

Accordingly, the universe is not considered as a mere structure of objects or events. Instead, it is a living cosmos, with a generic mind. That universe is observed individually, through the microcosms of our individual personalities. But its generic mind is shared in common, at the underlying background where we co-ordinate and communicate our differing experiences.

In this conception, it is acknowledged that our bodies and minds are limited at the surface of particular attention. But it is also considered that each limited person has an inward access to the whole generic mind and to its unlimited potential, which is expressed in all happenings throughout the universe.

This is the reasoning behind old ritual practices. They are taken to evoke subtle powers from an inner depth of mind that is shared in common, by each of our microcosms and the macrocosm as a whole. In a ritual act, the shape and quality of action is conceived to produce a particular effect – through an awakened flow of subtle energy that is drawn up, into the living faculties of a ritual practitioner.

That awakened flow is described in the science of 'prāṇāyāma' or 'living energy control'. Here, the material body is conceived as manifesting an organic system of energy currents. The system is centred upon a vertical axis, which rises through the spine and goes up to the top of the head.

Along the axis, there are nodes called 'cakras' or 'centres', where branching currents originate. The bottom-most node is the 'mūlādhāra cakra' or the 'root support centre'. Here, it is conceived that an infinite energy lies usually dormant, like a coiled up serpent in a covered hole. That energy is called 'kuṇḍalinī' or 'coiled'. From it arise three channels that proceed up the vertical axis, to feed the cakras or the nodal centres above.

Two of the channels are limited, as they produce the limited life and activities of a particular body in the world. One of these channels is called 'pingalā' or 'tawny'. It carries an *e*ffective energy that drives the body's movements in the world. The other channel is called 'iḍā' or 'refreshing'. It carries an *a*ffective energy that enables sensation and perception.

Between these two limited channels, a central channel is conceived to be unlimited. It is called 'suṣhumṇā' or 'gracious'. It is a channel of spiritual grace, with an unlimited capacity to carry the infinite energy called 'kuṇḍalinī'. In most people, that infinite energy is very little used. Almost all of it stays dormant – as its central channel is blocked off, by the disharmony and dissipation that makes energy seem limited, in our habituated bodies.

However, it is also considered that body and mind can get better tuned and harmonized – through purity of ethical conduct and character, through practices of balanced posture and breath control, through concentration of attention, and through clarity of thought and depth of feeling. In the course of such psychosomatic tuning, it is conceived that the central channel can be opened up; so that the unlimited energy of kuṇḍalinī uncoils itself and rises up through a series of seven cakras, where a variety of subtle powers are progressively made manifest.

All disciplines of ritual are conceived to work through this kind of psychosomatic tuning. The tuning is both microcosmic and macrocosmic. It is meant to harmonize the microcosmic actions of a living individual, who functions in a macrocosmic

world. As ritual acts draw power from the depth of mind, they imply a dual functioning. A living individual acts microcosmically, in conjunction with a corresponding macrocosm that is seen outside.

That correspondence, of macrocosm and microcosm, is investigated in the science of astrology. When the universe is seen at large, in the constellations of the sky, it naturally manifests a macrocosmic order, which is taken to express the same unlimited potential that is found manifested in our microcosmic bodies.

The stars and the planets are thus interpreted biologically, as macrocosmic signs of living potencies that subtly influence our microcosmic lives. The influence comes from a generic depth of mind that each microcosm shares in common with the entire universe.

In this biological interpretation, the stars and planets do not act mechanically, as objects that exert some external force upon our physical or mental actions. Our lives are not here conceived as driven from outside, by distant bodies in the sky. Instead, the movements of the planets and the stars are taken to be meaningful expressions, which speak to us of living potencies that influence our personalities and circumstances from within.

The movements of stars and planets are described mechanically, through astro*nom*ical calculations that are used to tabulate the almanac and to draw up a horoscope. But, as astro*log*ical configurations are interpreted, a reflective reasoning becomes essential, in order to apply the formal calculations to a living situation.

Astrology is thus a different kind of science from modern physics. It cannot be tested and applied mechanically, through external instruments and machines. It can only be tested and applied through the educated faculties of a living astrologer. Those faculties can sometimes be tested by using them to predict particular events, but the prediction is never just mechanical. It is always achieved through a living interpretation that is being put to test, so as to uncover and to clarify misunderstanding.

Moreover, it is quite explicitly conceived that astrology cannot be applied through prediction, in the way that modern physics is. For example, when a bridge is being built, modern physics works by predicting the breaking stress of various structural components. This enables engineers to calculate an optimal design, which makes the best use of available materials.

But astrological descriptions are not meant for engineering. They are not meant to calculate the design of artificial structures and machines, whose functioning is independent of our living faculties. Instead, the descriptions of astrology are meant to reveal the organic order of a natural universe in which our living faculties take part.

Astrological descriptions are thus meant to be applied organically – so as to harmonize and clarify the living actions, thoughts and feelings of our bodies and our minds, in their journey through the world. This organic application is described by the Sanskrit word 'prashna', which means both 'problem' and 'enquiry'. It implies a pragmatic investigation into problems that have arisen and how they might be resolved. An astrologer thus uses a questioning investigation to determine what actions and rituals are appropriate and when they are best performed, in the course of individual life.

In Sanskrit, the science of astrology is called 'jyotiṣha'. It is the science of 'jyoti' or 'light'. Astro*nom*ically, an objective light is seen, shining from the stars and reflected by the planets. But astro*log*ically, all outward light seen shining in the sky is

understood to manifest an inner light that shines subjectively, from a common background of all physical and mental experience.

As an astrologer interprets macrocosmic patterns in the sky, there is a reflection back – into a common depth of mind from which our individual lives and circumstances are conceived to arise, in their variety of different situations. The reflection works through a logical analysis of various living potencies that are seen manifested in the stars and planets in the sky. The use of this analysis is educational. It is meant to sharpen an astrologer's judgements and intuitions about living individuals, in the various situations that arise and develop in the course of their lives.

It's only thus, through a delicately educated judgement, that an astrologer can make predictions and suggest effective actions which are helpful to particular individuals, in their various journeys through the world.

Communication and enquiry

Linguistics and humanities

In our modern education, as it stands at present, there is a certain bias towards modern physics and the external world that it describes. Accordingly, we tend to think of information as a transacted commodity, which is recorded and conveyed in external forms. But, in old sciences of language, there is a very different view of information and recording. This older view is clearly shown in the English words 'inform' and 'record'.

- The English word 'inform' comes from the Latin 'informāre'. It implies an inner formation, a giving of shape that arises from consciousness within. This is the root meaning of 'information'. It describes a communication whose external form is shaped from within, so as to express a living meaning.
- The English word 'record' comes from the Latin root 'cor' – which describes an essential 'core' of mind and meaning, found living in the 'heart' of each outward personality. To this root is added the prefix 're-', which means 'again' or 'back'. What's here implied is a reflection back from outer form into the inner core of heart, through which a living meaning is recalled to mind.

The same conception is implied in the Sanskrit words 'ākṛiti' and 'nibandhana'.

- In the word 'ākṛiti', the prefix 'ā-' implies an inner origin and 'kṛiti' means a 'making' or a 'forming'. Thus, 'ākṛiti' describes a generic name whose form arises from within, so as to represent a universal principle that's shown in common by differing particulars.
- In the word 'nibandhana', the prefix 'ni-' means 'down' or 'back' and 'bandhana' means 'tying' or 'relating'. Accordingly, 'nibandhana' describes a 'tying down' or a 'relating back' of living meaning to an inner ground. This word 'nibandhana' is used to mean 'recording'. It conceives of recording as a tying down of meaning. But here, the tying down is not an objective correspondence, which relates outward symbols and their represented objects. Instead, it is a subjective grounding – which relates back in, to underlying consciousness.

In this old view of communication, all structured forms and their meanings are conceived as differing expressions of a common ground that is unstructured in itself. That ground is an inmost universal or generic principle – from which arise all differentiated things, as its particulars. As it becomes expressed, it gives rise to a variety of generic names and classes that in their turn give rise to more differentiation into further and further particulars.[17]

The differentiation is resolved by observing structured form and interpreting its meaning, so as to understand how different things relate. That understanding is recorded by assimilation back into the underlying ground, which has continued through the arising and the resolution of apparent differences. Communication is accordingly conceived as a living process – which keeps reflecting back and forth, between a structured world that is perceived outside and an unstructured ground of consciousness from where the world is known.

In Sanskrit, the science of linguistics is called 'vyākaraṇa', which means 'analysis'. The name is revealing. It describes an ancient science that is highly analytic, both in its formal descriptions of objective structure and in its reflective questioning towards an underlying ground of subjective knowing.

- The description of structure is laid out in a standard text by the grammarian Pāṇini. It is called the *Aṣhṭādhyāyī*. In a highly mathematical and concise way, it defines the complex structure of classical Sanskrit grammar – including the formal roots of words, their inflected conjugations and declensions, their augmented and compounded formations, and their syntactic use in sentences.
- The reflective questioning is opened up in a further text, called the *Vākyapadīya*. It was composed by Bhartṛihari, who is a linguistic philosopher. In the *Vākyapadīya*, he makes a study that belongs to the classical tradition of Sanskrit linguistics; but the study is reflective. It starts out from the accepted formulations of the Sanskrit language in particular. But it makes use of these formulations to investigate more fundamental principles – which are shown in common by all meaningful experience, in all languages and cultures and in nature as a whole.[18]

In traditional times, before the rise of modern physics, classical systems of education were centred on the learning of a classic language – like Arabic or Latin or Greek or Hebrew or Mandarin Chinese or Persian or Sanskrit. Accordingly, a student was initiated into higher learning by the formal systems of a classical language – in particular the systems of pronunciation, semantics, inflexion and syntax – which were analysed and cultivated through the science of linguistics. In this practical way, linguistics was the initiating science of a classical education. It was the first science that was used to train a student's mind; and other sciences were subsequently learned, through that initial training.

It was then only natural that linguistics should serve as a model for many other sciences, in a variety of classical traditions. Today, in our modern physical sciences, the calculating discipline of mathematics provides a model of reasoned exposition that is central to many special branches of modern physics, through which we describe and fabricate external structures in the world. Similarly, in our various classical traditions, the educating discipline of linguistics has provided a model of reasoned exposition that is central to many further disciplines – through which we cultivate our communication of information, and thus clarify our cultural conceptions of a meaningful and valued world.

These further disciplines are called the 'humanities'. We use them in two ways. On the one hand, we use them creatively, through an essential element of imagination that conceives our various descriptions and pictures of the world. But on the other hand, we also use the humanities in a reflective way, through an equally essential element of interpretation, which finds meaning and value in the pictures that have been conceived.

In the Sanskrit tradition, the humanities include vyākaraṇa or linguistics, tarka or reasoned argument, sāhitya or literature, nāṭya or performing art, shilpa or architecture and graphic art, purāṇa or mythology, and itihāsa or history. From these examples, it can be seen that two questions arise, when we think of the humanities as shāstras or sciences.

- The first question arises from the creative and artistic element of the humanities. They work through a combination of analytic science and imaginative artistry.

Each of these disciplines is both an art and a science, at the same time. It is a human art that develops living skills of conceiving imagination. But the skills are refined through the systematic governance of a shāstra or a science that is reasoned analytically.

This throws into question a habitual opposition that we make, between art and science. The opposition is based on a restricted view of nature, as an external world that is opposed to the imagination we experience and develop in our minds. When nature is viewed more broadly, to include our inwardly conceiving minds, then the opposition between art and science is resolved. It is then quite legitimate for science to apply its study of nature to the intuitive and imaginative skills of our creative arts. And it is also quite legitimate that science should be tested and applied through the cultivation of those skills.

That broader view of nature can be seen in the very name of the Sanskrit language. 'Saṁskṛit' means 'cultivated' or 'refined'; and hence the word 'saṁskṛiti' means 'culture'. But this is a cultivation that takes part in 'prakṛiti' or 'nature'. A look at the etymology is helpful here.

In the word 'prakṛiti', the prefix 'pra-' means 'forward' and 'kṛiti' means 'acting' or 'doing' or 'making' or 'forming'. Thus, 'prakṛiti' means 'acting forth' or 'producing forth'. In particular, it refers to an acting forth of nature that produces all physical and mental appearances.

In the word 'saṁskṛit', the prefix 'sam-' means 'together with' or 'in harmony with' and 'kṛit' means 'acted' or 'done' or 'made' or 'formed'. Thus, 'saṁskṛit' means 'harmoniously done' or 'harmoniously formed'. In particular, it refers to a cultivated expression that relates things properly together – in harmony with underlying nature, from which all expression has been born. It's here conceived that all arts and cultures are refined reflectively – through a reflective grounding back into an underlying life of nature, in which they all participate.

- It's from this reflective refinement that the second question arises, in thinking of the humanities as sciences. The question is concerned with how cultural expressions are interpreted. As different cultures come into contact with each other, it becomes quite evident that our use of language and expression is essentially relative. As words and expressions are interpreted, they convey a meaning that is understood in relation to their cultural context.

  All our statements and descriptions are thus culturally relative, including those that we make in our scientific disciplines. But then, how can these disciplines be truly scientific? How can their statements be interpreted to show us an impartial knowledge that applies to different cultures, beneath the many differences and partialities of cultural expression?

  Today, this question is investigated in our modern disciplines of history and anthropology. These disciplines describe a variety of different cultures, over different periods of time and in different parts of the world. Through the use of modern media and communications, we are able to record and examine a far greater variety of cultures than was possible in traditional times; so that our modern history and anthropology is far better informed with externally recorded facts about historical events and cultural behaviour.

  Thus, in the stories that we tell, we are now much better able to distinguish a historical recording of external facts from a mythical and fictional imagination that makes use of stories for more subtle purposes of conceptual meaning and emo-

tional judgement. In the Sanskrit tradition, there was relatively little historical recording that was kept distinct from mythical imagination. In this particular tradition, an inward-going tendency has long been associated with an emphasis on 'purāṇa' or 'mythology', at the expense of 'itihāsa' or plain 'history'. It wasn't till the nineteenth century that Hindus took wholeheartedly to a recording of plain history, where external facts are kept carefully distinct from mythical and fictional embellishments.

From this lack of historical recording, it might be thought that Hindus have less interest in their past, and that they might not have much sense of cultural relativity. But, in fact, the opposite is true. In the Sanskrit tradition, there is a keen sense of relativity in different cultures, past and present. Early cultures are treated with a great respect, as seminal expressions of an ultimate knowledge whose expression has now grown to become more elaborate.

Each system of culture is described as a 'darshana' or a 'seeing'. Through its use of language and expression, each culture forms its own distinctive view of the world. And each such view is a relative way of approaching a final knowledge that all cultures and their views express.

This relativity is exemplified by Shrī Rāmakṛiṣhṇa – who lived in Bāngladesh, in the nineteenth century. Through his disciples, we have some fine historical accounts of his life, with a careful attempt to distinguish fact from hearsay and embellishment. He was extremely traditional in his own outlook; and he usually conceived the world in purāṇic and religious terms, as a worshipper of the goddess Kālī. But he very clearly recognized that this was only one view among many others. At various different times in his life, he adopted very different views, including Christian and Islamic meditations, as relative paths to a common goal of truth. And when it came to choosing a successor, he handed on his teachings to Svāmī Vivekānanda, who was very much a modernizing rationalist. A major transition was accordingly achieved – between a teacher and a disciple who were educated very differently, in ways that might seem to be quite incompatible.

The same relativity is found, of course, in many different parts of the world. We find it also in the teachings of Socrates – as recorded by his disciple Plato – in Ancient Greece, some two and a half thousand years before Shrī Rāmakṛiṣhṇa. In Plato's dialogues, we find that Socrates combines a very thorough reasoning with a profound respect for ancient traditions like those of Egypt, which must have had a very different culture from Socratic Greece.

But when we speak like this, of different cultures that are relative, it must be understood that this relativity is cultural. As Socrates and Rāmakṛiṣhṇa make quite clear, it's only cultures that are relative, not truth. Each cultural expression is a partial instrument, limited by its particular conditioning. It is an instrument that shows a meaning, but the meaning is not fully shown. Each expression partly shows and partly hides its meaning. The meaning that is shown at first is only partly true. It's partly true and partly false as well. To understand it properly, it has to be interpreted more deeply, so as to uncover a truer meaning.

That's why the humanities are needed. They are educating disciplines, which cultivate our faculties of expression and interpretation, in the context of our various cultures. They help us to make better use of our partial and particular expressions; and they help us to interpret those expressions, towards a better understanding of less partial and more universal principles.

Psychology

But, as we use our cultural expressions, we each depend on inner capabilities that are developed individually, at a depth of intuition in our individual characters. These inner capabilities are investigated in the science of psychology. In the Sanskrit tradition, that science is called 'yoga'.

Literally, the word 'yoga' means 'union' or 'harnessing'. As this name implies, the science of yoga works through a practical technology – which harnesses our living faculties, towards a final union with their inmost principle. In the *Yoga-sūtras* of Patanjali, the science of yoga is described as an integrated system with eight branches of discipline.

The first two are branches called 'yama' and 'niyama'. They are disciplines of conduct and behaviour in the world. The third branch is 'āsana' or 'sitting'. It is a discipline of bodily posture, which serves to prepare for the disciplines that follow. The fourth branch is 'prāṇāyāma' or 'living energy control'. As described in the previous talk, this is a biological discipline – which is meant to control and awaken the living energy of prāṇa, in the body's functioning.

These first four branches of yoga are psychosomatic, concerned with both mind and body. The fifth branch is 'pratyāhāra' or 'withdrawal'. This is a discipline of withdrawal from the body and its outward world of space and structure. Accordingly, the body and its structured world are left behind – as attention is turned inward, to the mind and its succeeding states that keep replacing one another in the course of time.

The sixth branch is 'dhāraṇa', which means 'holding' or 'concentration'. It is a discipline of holding on to an absorbing object of attention. A suitable object is chosen and attention is turned towards it. As attention keeps wandering and turning away, it is brought repeatedly back; so as to focus again and again upon the chosen object, which thus becomes the centre of a sustained process of co-ordinating thought. This exercise is meant to relax the mind's habitual tendency towards distraction and dissipation. Instead of being driven by its clamouring distractions, the mind is trained to get relaxed, in a progressive concentration of energy and attention upon a single object.

As attention gets more focused on a single object, that object is perceived and thought about and felt more deeply. Superficial appearances and impressions give way to a deeper contemplation of what the object is in itself and what it further shows. Such deeper contemplation is called 'dhyāna' or 'meditation'. It implies a falling back into a depth of mind that a yogic practitioner uncovers, in her or his own experience. This is the seventh branch of yoga. It enables a detachment of undistracted and disinterested awareness – whose silent knowing carries on at the background of experience, quite unaffected by the changing appearances that come and go at the surface of the mind.

As meditation deepens, it results in special states of 'samādhi' or 'absorption'. This is the eighth and last branch of Patanjali's yoga. In a state of samādhi, the mind is powerfully drawn back in. There is an intense awareness, but not of outward things. The wandering mind becomes absorbed in an intensity of inner experience, which somehow knows more deeply and truly than before.

Broadly speaking, there are two kinds of samādhi. On the one hand, a samādhi may be '*sa*vikalpa', which means that it contains some 'vikalpa' or 'differentiated perception'. Alternatively, a samādhi may be '*nir*vikalpa', which means that no differentiated perception is contained in it.

In a savikalpa samādhi, attention is absorbed in some particular perception – like the sound of a mantra, or a vision of God or of some spirit. A classic example occurs in the *Bhagavad-gītā*, when Arjuna is granted a vision of the universal form of God. In Arjuna's vision, the body of God contains the entire universe, of moving and unmoving things. There is thus an intense perception, which contains everything in itself.

This is characteristic of a savikalpa samādhi. It is a state of such intense perception that everything becomes absorbed in it. Then the world of external objects disappears. There is nothing but perception, containing everything perceived, just like a dream. In its content, a savikalpa samādhi is an intense dream. There is only pure perception, with nothing seen outside. Perception is no longer directed outward, to external objects. Attention has been turned back in, so that perception is absorbed within the mind.

In a nirvikalpa samādhi, the absorption proceeds further. Not only is perception absorbed into the perceiving mind, but the mind becomes absorbed as well – in a state where no perceptions appear at all. In its content, a nirvikalpa samādhi is exactly the same as deep sleep. There are no differentiated perceptions in it. There is no sense of passing time, in which appearances could come and go. There's only pure experience, unmixed with any physical or mental things that are perceived in space or time.

In short, a savikalpa samādhi is a special kind of dream; and a nirvikalpa samādhi is a special kind of deep sleep. But then, what makes these samādhi states so special and intense? The answer does not really lie in their content, but in the way that they are approached and regarded, from the waking state.

Our everyday states of dream and deep sleep are entered involuntarily; and we take them largely for granted, without paying much attention to them. But, in yoga and in other such spiritual disciplines, special states of samādhi are cultivated through intensive practices that require a tremendous effort, sustained over a very long period of time. And when such samādhi states are attained, they are regarded with a corresponding degree of intense interest and respect. For they are conceived as specially altered states of experience – through which the perceptions and powers of a person's mind can be expanded, far beyond its habitual limitations.

This expansion is described by the name 'saṁyama' or 'integrated control'. It is a collective name for the last three branches of yoga: dhāraṇā or concentration, dhyāna or meditation, and samādhi or absorption. By concentrating upon an object, meditating upon its meaning and becoming inwardly absorbed into its true significance, a practitioner of saṁyama is supposed to attain control over subtle powers of nature, which the object manifests.

But yoga warns us that its altered states and subtle powers can themselves be a distraction, from a more essential goal. All states and powers are conceived as passing means that only serve to purify our characters, on the way to a final union with an inmost truth. The purpose of samādhi is to weaken egotistical attachment, by a forceful turning back from our conditioned minds and bodies to an unconditioned truth.

It's through this forceful turning that the mind is investigated and conceived, in the psychological sciences of yoga and meditation.

Philosophy

There is a further science that makes use of mind, but in a rather different way. This is the science of philosophy. It is a discipline whose aim is completely educational. It

is not meant to achieve any object in the world. Nor is it meant to develop any physical or mental capability. All capabilities that it may develop are completely incidental to its proper aim.

That proper aim is described by the word 'philosophy'. In ancient Greek, 'philo-' means 'love' and 'sophia' means 'wisdom' or 'true knowledge'. The motivation of philosophy is thus described, as an uncompromising love for truth. It is a discipline that looks for truth, beyond all compromise with falsity. In this discipline, all capabilities are made to serve a single, overriding aim. That aim is to know more clearly; so long as any compromise remains, in what is taken to be true.

Thus, in philosophy, the use of mind is always skeptical. Philosophical ideas are not meant for the purpose of constructing theories or descriptions. Instead, they are meant to raise questions, about the beliefs and assumptions on which theories and descriptions have been built. These questions in themselves are constructed thoughts, which have arisen from beliefs and assumptions that are taken for granted. Accordingly, the questions must turn back upon themselves, to ask what their own concepts mean and what they take for granted.

As questions are thus turned upon themselves, they reflect into the depth of mind. But this reflection is not forcefully achieved, by any exercise of mental power. Instead, it is inspired naturally, whenever truth is genuinely sought. The search then turns upon itself; and thus keeps asking further down, to look for truer knowing. The asking does not work through force, but instead through a disinterested examination. Whatever mind conceives is examined carefully, in order to remove mistakes and thus to be more accurate.

In the Sanskrit tradition, it is conceived that truth has three aspects. The first is 'sat', which means 'being' or 'reality'. The second aspect is 'cit', which means 'knowing' or 'consciousness'. And the third aspect is 'ānanda', which means 'happiness'. These three aspects are approached in three ways.

- 'Sat' or 'reality' is approached through 'yoga' or 'union'. This is the way of meditation. It is meant to expand the mind beyond its limitations – through meditative exercises that withdraw from conflicting objects, towards a final union with that one complete reality which underlies all differences.
- 'Cit' or 'consciousness' is approached through 'jnyāna' or 'knowledge'. This is the way of philosophy. It is meant to reflect beneath all partial faculties – by asking skeptical questions that keep on detecting and removing falsity, towards a clear knowing where no ignorance remains.
- 'Ānanda' or 'happiness' is approached through 'bhakti' or 'devotion'. This is the way of spiritual surrender. It is meant to give up all petty claims of personal possession – for love of an ultimate value that motivates all feelings, thoughts and actions in the physical and mental world.

Each of these three aspects has a further counterpart, in our individual personalities. 'Sat' or 'being' is made manifest in our transforming lives. 'Cit' or 'knowing' is made manifest in our investigating thoughts. And 'ānanda' or 'happiness' gets to be manifest in our participating feelings, through which we take part in a functioning of nature that extends throughout the world.

As the aspect of being is approached through meditation, the living personality is meant to be transformed, towards a state of true perfection where all limitations have been overcome. As the aspect of knowing is approached through philosophy, the

questioning of thought is meant to be reflected back, to an underlying truth where no falsity remains. As the aspect of happiness is approached through spiritual surrender, all feelings are meant to participate completely, in the realization of an ultimately valued truth.

In this division of three ways to truth, a special warning is needed, about the application of philosophy. In particular, it needs to be understood that philosophy is not an academic or an intellectual subject. Its questions can of course be debated academically, by intellectual scholars who belong to different schools of thought. It's through this debating that each school sets out its own system of thought, in competition with other schools. Here, each school attacks the views of other schools, in order to establish a systematic view of world that represents the school to those who see it from outside.

But this construction of world views is not the actual practice of philosophy. Its actual practice is no building up of any theoretical construction. Instead, it is an asking down – which looks beneath all constructed thought and belief, in order to investigate a more direct experience of true knowing. As each school describes the world, it is only setting out an external view that must eventually turn inward, by provoking a reflective questioning. For every school of genuine philosophy, debate is no more than an intellectual preparation. It only serves to set the stage for a reflective questioning, which is the actual practice of philosophy.

That actual practice starts when one is skeptical of one's own views, thus opening one's own beliefs to question and correction. When one attacks the views and the beliefs of others, then this is just a theoretical debate with no essential effect upon one's own understanding. But when one's questioning turns round reflectively upon one's own mistaken assumptions, then one's own understanding is at stake. And if such questioning is genuine, then it amounts to an investigating experiment, in which one looks to see what clearer understanding may be found.

The results of such a questioning are then inherently practical, for the new understanding gets inherently expressed in further feelings, thoughts, actions and perceptions that arise from it. It's through such questioning that we get educated, as we learn in practice, from the process of continuing experience.

But, in the end, philosophy looks for a truth that is of value in itself. That truth is ultimately spiritual. To realize its final value, nothing more is needed than pure knowing. It needs no further justification, by any actions, thoughts or feelings that express it in some physical or mental form.

At this point, many people have a problem with philosophy. There seems to be a contradiction here, between the skepticism of philosophy and the faith that is required for a spiritual enquiry. But there is a simple way of resolving this contradiction. Philosophy is not a faithless enterprise. It does have a special faith, in the value of true knowing. So it investigates that knowing, by its reflective questioning of what the mind believes. It the enquiry is carried far enough, it reflects from all conceptions to investigate a knowing which is quite unmixed with any objects that the mind has conceived. That knowing is then purely subjective, and thus spiritual. It's in this way that philosophy proceeds to a spiritual enquiry.

There is, accordingly, a profound connection between philosophy and spiritual devotion. It is described in Shrī Shankara's *Viveka-cūḍāmaṇī* (stanza 31).

mokṣa-sādhana sāmagryāṁ	Among all ways of striving to be free,
bhaktir eva garīyasī .	it's love that is the best, one must agree.
sva-svarūpā-'nusandhānaṁ	To question one's own truth, to ask what's there:
bhaktir ity abhidhīyate ..	that is the love of those who ask with care.

Appendices

Objective and subjective

In the old sciences, the terms 'objective' and 'subjective' are somewhat differently conceived from a usage that has come into prevalence today, in connection with our current emphasis on modern physics. The older conception can be seen from the following analysis of Sanskrit terms.

Objective – *bhautika* (from 'bhū' – to 'become', to 'happen', to 'take place')	Subjective – *ātmīya* (from 'ātman' – 'knowing subject, inmost self')	'Objective' is related to becoming and change. 'Subjective' is related to an unchanging self that knows all change.
Worldly – *laukīka* (from 'lok' – to 'perceive' and 'loka' – 'region, world')	Spiritual – *ātmīya* (from 'ātman' – 'knowing subject, inmost self')	The 'world' is conceived as made up from objects of perception. 'Spiritual' is conceived as truth of knowing self.
Belief – *mata* (from 'man' – to 'think, suppose')	Faith – *shraddhā* (from 'shraddhā' – to 'trust, be convinced')	'Belief' is an outward habit of supposing and assuming. 'Faith' is conviction, from an inner depth of experience.
	Science – *shāstra* (from 'shās' – to 'correct, chasten, govern')	In science, beliefs are governed, tested and corrected by systematic reason and investigation.
	Enquiry – *vicāra* (from 'vicar' – to 'reflect, question')	Science progresses by asking reflective questions, about assumptions and beliefs that have been taken for granted.
Particular thing – *visheṣha* (from 'vishiṣh' – to 'distinguish')	Generic principle – *tattva* (literally 'tat-tva' – 'thatness')	Particular things are differing instances of generic principles that are shared in common .
Personal – *pauruṣheya* (from 'puruṣha' – 'man, human-ness')	Impersonal – *apauruṣheya* (the prefix 'a-' means 'not')	Each person is derived from a common principle of human-ness, which is itself impersonal.
Seeing – *darshana* (from 'dṛsh' – to 'see, behold, perceive')	Knowledge – *jnyāna* (from 'jnyā' – to 'know')	'Seeing' is a partial perception of differing objects. 'Knowing' is an impartial realization of underlying truth.
Apparent form – *rūpa* (from 'rūp' – to 'form, exhibit')	True nature – *svarūpa* (the prefix 'sva-' means 'self-, own')	'Apparent form' is a superficial view, seen from outside. 'True nature' is experienced at the depth of self, within.

Essentially the same conception is found in ancient traditions throughout the world. Here is a description of it in European history (quoted from *The Oxford English Dictionary*, Oxford University Press, England, 1933 – from the entry 'Objective').

> The Scholastic Philosophy made the distinction between what belongs to things subjectively (*subjectīvē*), or as they are 'in themselves', and what belongs to them objectively (*objectīvē*), as they are presented to consciousness. In later times, the custom of considering the perceiving or thinking consciousness as pre-eminently 'the subject' brought about a different use of these words, which now prevails in philosophical language. According to this, what is considered as belonging to the perceiving or thinking self is called *subjective*, and what is considered as independent of the perceiving or thinking self is called in contrast *objective*.... this transition of use (which primarily con-

cerns the word *subjective*, and affects *objective* as its antithesis) resulting in what is almost an exchange of sense between the two adjectives...

[The word ‘objective’ has thus two meanings, as follows.]

a. Opposed to *subjective* in the older sense = ‘in itself’: Existing as an object of consciousness as distinct from having any real existence; considered only as presented to the mind (not as it is, or may be, in itself or in its own nature)....

b. Opposed to *subjective* in the modern sense: That is or belongs to what is presented to consciousness, as opposed to the consciousness itself; that is the object of perception or thought, as distinct from the perceiving or thinking subject; hence, that is, or has the character of being, a thing external to the mind; real.

The five senses

From the Sānkhya system of philosophy, there comes an analysis of five ‘tanmātras’ or ‘subtle elements’. They are considered to be subtle essences that show an inner correspondence, between the old five elements of the external world and the five senses of personality.

- The first tanmātra is that of ‘earth’ and ‘smell’. Here, ‘earth’ can be interpreted as objective matter, which is divided into particular objects. Each object is a piece of matter; and together all such objects make up an external world. At this level, experience is viewed through the kind of perception that identifies a particular object, as something different from other things. That kind of perception is represented by the sense of smell, which sniffs out particular things. As for example when a dog sniffs out a trail of scent. Or when we speak of ‘smelling a rat’, to imply a sense of detection that zeroes in on something particular which has gone wrong.
- The second tanmātra is that of ‘water’ and ‘taste’. Here, ‘water’ can be interpreted as flowing energy. Each particular object is conceived to be a gross appearance, made of something more subtle than what previously appeared. It is not a separate piece of matter; but, instead, it is a pattern of energy currents, flowing from and into other patterns. At this level, experience is viewed through a sympathetic activation of energy in the perceiving organism. That kind of perception is represented by the sense of taste. It is clearly moved to act in sympathy with the flavours that it perceives. As it perceives an attractive or repulsive flavour, its own perceiving action is attracted or repelled accordingly.
- The third tanmātra is that of ‘fire’ and ‘sight’. Here, ‘fire’ can be interpreted as meaningful information. Each apparent form or pattern is conceived to have a meaning, and thus to represent something that has to be interpreted. At this level, experience is viewed through the interpretation of apparent form. That kind of interpretation is represented by the sense of sight. It shows us visual shapes and forms that clearly have to be interpreted, to tell us what is thus perceived.
- The fourth tanmātra is that of ‘air’ and ‘touch’. Here, ‘air’ can be interpreted as conditioned quality. Each representation is conceived to be made up of relative qualities, which have to be evaluated. At this level, experience is viewed through the qualitative evaluations of intuitive judgement – as represented by the sense of touch.

- The fifth tanmātra is that of 'ether' and 'sound'. Here, 'ether' can be interpreted as pervading continuity. Each variation of quality is conceived to show a common continuity of underlying principle. At this level, changing experiences are viewed through the penetration of insight – to show an underlying continuity that they share in common. That kind of insight is represented by the sense of sound. It hears the changing sounds of words, and understands through them a continuity of meaning and consciousness that they express.

Five faculties of mind

In the Advaita Vedānta tradition, four faculties of mind are often distinguished. They are: 'ahankāra' or 'ego', 'citta' or 'will', 'buddhi' or 'intellect', and 'manas' or 'psyche'. A fifth faculty is sometimes added, so as to make a five-fold division that corresponds to the old five elements. The fifth faculty may be described as 'anta-karaṇa' or the 'inner faculty'.

- 'Ahankāra' or 'ego' is the faculty that makes our minds particular. It identifies the knowing self as a particular person – with particular faculties of body, sense and mind. When self is thus identified, as a physical and mental person, attention turns to objects in particular, in a physical and mental world.
- 'Citta' or 'will' is the faculty that directs action, towards particular objectives. As action is directed thus, from one object to another, different objects are observed to interact with each other, so as to form a changing world.
- 'Buddhi' or 'intellect' is the faculty that formulates descriptions and interprets them. Through these descriptions, it prescribes objectives for our actions to achieve.
- 'Manas' or 'psyche' is a qualitative faculty of inner judgement, which constitutes each person's mental character. It is that faculty through which perceptions and descriptions are evaluated, as they are gathered into meaningful experience. In every personality, this inner judgement is what motivates the choices that are made, in deciding on prescribed objectives.
- 'Anta-karaṇa' is an inmost faculty that may be called 'generic mind'. It grounds our differentiated faculties in underlying consciousness, from where all differences and all particulars arise.

Six systems of philosophy

Vaisheṣhika-Nyāya	Assumes an *external world* of differentiated objects.	Analyses the *structure* of descriptions and arguments.	Body
Sānkhya-Yoga	Assumes a manifesting *nature* that produces appearances before the light of *consciousness*.	Explains how nature manifests appearances of world, through an evolving *process* that expresses consciousness.	Mind
Mīmāmsā-Vedānta	Examines differentiated actions and appearances, in search of underlying *potencies* and *principles*.	Mīmāmsā is concerned with the achievement of desired results, through the *causal potency* of prescribed actions. Vedānta asks for an impartial truth that is independent of all change and difference. The questioning reflects *beneath all causality* of action and result.	Consciousness[19]

In classical Sanskrit, six systems of philosophy are sometimes distinguished and grouped in pairs. There are thus three pairs, corresponding to the three-fold division of body, mind and consciousness. This is shown in the table above.

Notes

[1] A closer look at the etymology of 'science' does seem to imply this as well. The Latin 'scientia' comes from the verb 'scīre', which means to 'know'. 'Scīre' in turn is probably related to another Latin word 'scindere', which means to 'split' or to 'divide'. And from 'scindere', there is a connection on to the English words 'schism', 'schedule' and to 'shed'. The last word 'shed' implies 'discarding', as for example when a snake sheds its skin or when an inner core of truth sheds superficial and misleading appearances.

[2] 'A' is pronounced as '-er' in 'father' (without any 'r' sound). 'U' is pronounced as 'oo' in 'good'. 'Mmm…' is pronounced as a humming sound, with the mouth closed.

[3] This restricted version is called the '*special* theory of relativity'. It only considers observers who move at uniform speeds, in relation to one another. It does not consider accelerating observers, and it gives no account of gravity. That restriction is removed in the '*general* theory of relativity'.

In the general theory, it is shown how an observer's view of space and time gets distorted by acceleration, from the viewpoint of another observer. Each travels through the same continuity of space and time; or, in other words, through the same 'space-time continuum'. But, for each observer, the other's view appears to bend the continuum into a distorted curvature. Where one observer sees an object moving uniformly in a straight line, the other sees the same object traveling with an acceleration that curves its path through space and time.

This space-time curvature gives rise to a geometric account of the gravitational field. Gravity and matter are described in terms of a complicated geometry of space and time, as will be described in the concluding section of this talk.

[4] See footnote 3 above.

[5] 'Die Natur verbirgt ihr Geheimnis durch die Erhabenheit ihres Wesens, aber nicht durch List.' (Quoted at the beginning of Abraham Pais, *Subtle is the Lord…– The Science and the Life of Albert Einstein*, Oxford University Press 1983.)

[6] In ancient Greek, 'phusis' is related to 'phusein', which means to 'make grow, bring forth, produce, procreate'. The Greek root 'phu' thus generally implies a living growth that includes both body and mind. It is related to the Sanskrit 'bhū', which implies 'becoming, manifesting'.

[7] The translations in these talks are rather free, each giving only one of many possible ways in which the old texts may be translated.

[8] For Aristotle's concept of nature as self-moving, see R.G. Collingwood's *The Idea of Nature*, first published by Clarendon Press, Oxford, 1945, republished by Oxford University Press, paperback, 1960. Collingwood points out the opposition implied by the ancient Greek concepts of nature (*phusis*) and artifice (*tekhne*). As opposed to the artificial objects of technical manipulation, the things of nature 'have a source of movement in themselves'. 'When a Greek writer contrasts *phusis* with *tekhne* (i.e. what things are when left to themselves with what human skill can make of them) ... he implies that things have a principle of growth, organization and movement, in their own right and that this is what he means by their nature; and when he calls things natural he means that they have such a principle in them.'

[9] For Aristotle's conception of nature's love for the unmoved mover, see Collingwood's *The Idea of Nature*, as in note 8 above.

[10] In his treatise, *Peri psukhe* (also called *De Anima* or *On the soul*), Aristotle describes the unmoved mover as an inner principle of soul, of which we cannot rightly say that it 'feels anger' or 'thinks' or 'weaves' or 'builds' or is thus engaged in any personal act.

'Nor is it correct to say that the soul is itself moved, as in anger. It is even scarcely correct to speak of the soul as feeling anger. For this would be like saying that the soul weaves or builds. We should rather not say that the soul pities or learns or thinks, but that a person does so in virtue of the soul. And by this we would not mean that movement is ever *in* the soul. But rather, we should mean that movement is sometimes *from*, and sometimes *towards*, the soul.' [*Peri psukhe*, 408b, bk. 1, ch. 4]

(Translation adapted from two sources: *Brett's History of Psychology*, edited and abridged by R.S. Peters, George Allen and Unwin, London and Macmillan, New York, 1962; and *Aristotle: De Anima (On the Soul)*, translated by Hugh Lawson-Tancred, Penguin Classics, London, 1986.)

See also note 12 below.

[11] Some modern physicists have also been found to think in this way. Here is a quote from Albert Einstein, who evidently speaks in quite some consonance with the old way of thinking.

'... the scientist is possessed by the sense of universal causation.... His religious feeling takes the form of a rapturous amazement at the harmony of natural law, which reveals an intelligence of such superiority that, compared with it, all the systematic thinking and acting of human beings is an utterly insignificant reflection. This feeling is the guiding principle of his life and work, in so far as he succeeds in keeping himself from the shackles of selfish desire. It is beyond question closely akin to that which has possessed the religious geniuses of all ages.'

(Quoted in *Albert Einstein: Ideas and Opinions* – New translations and revisions by Sonja Bargmann, Rupa and Co., New Delhi, 1989. Quoted as taken from 'Mein Weltbild, *Amsterdam: Querido Verlag, 1934*'.)

[12] In India, self-manifesting nature is called 'prakṛiti' and the consciousness that witnesses nature is called 'puruṣha'. In ancient Greece, essentially the same conception was described by speaking of nature as 'phusis' and consciousness as 'nous'.

In his treatise, *Peri psukhe* (430a, bk. 3, ch. 5), Aristotle distinguishes two senses of the word 'nous'. The first is a changing and affected 'nous', characterized by its capacity to become all things. The second is a changeless and unaffected 'nous' that brings all things about, as light brings colours into appearance. The second 'nous' is separate and unmixed: as an immediate knowing which continues throughout experience, without stopping and starting. As Aristotle goes on to say, it is the second sense that tells us what 'nous' really is. 'When separated, it is alone just what it is; and this alone is immortal and eternal. But we do not remember it, because it is unaffected. Without it, nothing can be known by the affected and perishable nous', whose essence it thus is. (The preceding quote combines elements of Hugh Lawson-Tancred's translation, Penguin 1986, and the J.A. Smith translation, Oxford 1956.).

Six hundred years after Aristotle, the Greek philosopher Plotinus distinguishes between 'psukhe' and 'nous' (as two of three 'hypostases').

'Psukhe' is creating mind, which 'is the author of all living things… it has breathed the life into them all, whatever is nourished by earth and sea, all the creatures of the air, the divine stars in the sky; it is the maker of the sun; itself formed and ordered this vast heaven and conducts all that rhythmic motion: and it is a principle distinct from all these to which it gives law and movement and life….' [*Enneads*, V.1.11].

'Nous' is pure consciousness, which Plotinus describes as 'the unsoiled Intelligence' [*Enneads*, V.1.4]. It is 'That which sees... not through some medium but by and through itself alone...' [*Enneads*, V.3.8].

(The preceding quotes are excerpted from *Plotinus: The Enneads*, translated by Stephen MacKenna, Penguin Classics, London 1991.)

See also note 10 above.

[13] As described in the third talk of this series, and as summarized there in figure 4.

[14] See, for example, the discussion between Yājnyavalkya and Gārgī, in the *Bṛihadāraṇyaka Upaniṣhad*, chapter 3.

[15] To show this recent restriction of meaning, here is a quotation from *The Oxford English Dictionary*, Oxford University Press, England, 1933 (from the entry 'Physics').

> **Physics**...
> **1**. Natural science in general; in the older writers *esp.* the Aristotelian system of natural science; hence natural philosophy in the wider sense....
> The application of the term has tended continually to be narrowed. It originally (from Arist.) included the study of the whole of nature (organic and inorganic); Locke even included spirits (God, angels, etc.) among its objects. In the course of the 18th cent., it became limited to inorganic nature, and then, by excluding chemistry, it acquired its present meaning...
> **2.** In current usage, restricted to The science, or group of sciences, treating of the properties of matter and energy, or of the action of the different forms of energy on matter in general (excluding Chemistry, which deals specifically with the different forms of matter, and Biology, which deals with vital energy).

[16] The foregoing outline of Āyurvedic principles owes much to the following books: Dr David Frawley, *Ayurvedic Healing – A Comprehensive Guide*, Motilal Banarsidass, Delhi 1992; Dr David Frawley and Dr Vasant Lad, *The Yoga of Herbs – An Ayurvedic Guide to Herbal Medicine*, Motilal Banarsidass, Delhi 2004; Robert E. Svoboda, *Ayurveda – Life, Health and Longevity*, Penguin Books India, New Delhi 1993.

[17] The concept of an inmost universal is described in the following ancient verses that are quoted in the *Vṛitti* commentary on Bhartṛihari's *Vākyapadīya*, 1.1:

tasyai 'kam api caitanyaṁ bahudhā pravibhajyate .	"Thus consciousness, though one alone, seems differentiated forth in a variety of ways;
aṅgārā-'ṅkitam utpāte vāri-rāśer ivo 'dakam ..	"just like the convoluted show induced by energy of heat, in water vapour seen arising from the ocean's vast expanse.
tasmād ākṛti-gotra-sthād	"It's that which stands, the inmost form, the common, universal principle of every different class.
vyakti-grāmā vikāriṇaḥ . mārutād iva jāyante vṛṣṭimanto balāhakāḥ ..	"From it are born all kinds of changeable particulars: as rainy thunderclouds are born from air."

[18] An example of that investigation is Bhartṛihari's distinction of three levels: vaikharī, madhyamā and pashyantī. This was described in a previous talk, on *Language and tradition* (see figure 3).

[19] Mīmāmsā is concerned with the causal aspect of consciousness, whereby nature is motivated to produce particular manifestations in the world.

Vedānta is concerned with a reflective investigation towards the inmost being of consciousness, which shines by its own light. There, consciousness is known in identity, by merely being what it is. By that very being, consciousness illuminates itself. Its knowing light is the source from which all appearances get lit.